

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2009-0020

WASTE DISCHARGE REQUIREMENTS
FOR
NORCAL WASTE SYSTEMS OSTROM ROAD LANDFILL, INCORPORATED
OSTROM ROAD LANDFILL
CLASS II LANDFILL, CLASS II SURFACE IMPOUNDMENT,
AND CLASS II LAND TREATMENT UNIT
CONSTRUCTION, OPERATION, POST-CLOSURE MAINTENANCE,
AND CORRECTIVE ACTION
YUBA COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Regional Water Board) finds that:

1. Norcal Waste Systems Ostrom Road Landfill, Incorporated (hereafter Discharger), a subsidiary of Norcal Waste Systems, Incorporated, owns and operates the Ostrom Road Class II Solid Waste Landfill Facility. The site is located in unincorporated Yuba County and is immediately south of Ostrom Road and approximately 6 miles east of State Highway 65 and 1 mile east of Jasper Lane. Nearby population centers include the City of Marysville approximately 14 miles northwest of the site, and the City of Wheatland about five miles southwest of the site. The site occupies portions of Sections 10, 11, 14 and 15 of Township 14 North, Range 5 East, Mount Diablo Base Meridian, as shown in Attachment A, which is incorporated herein and made part of this Order by reference.
2. The 261-acre facility is comprised of Assessor's Parcel Numbers (APN) 15-080-17. The facility has been in operation since 1995, and to date, approximately 52 acres out of a total landfill development of 225 acres has been constructed and approved for operation. The facility is currently permitted to develop and operate two separate Class II waste disposal modules (Modules 1 and 2) with a total footprint of 221 acres. The disposal modules are separated by a former 40-foot wide 4-acre access easement. The Discharger proposes to incorporate the respective modules to form a single contiguous disposal footprint of 225 acres as shown in Attachment B, which is incorporated herein and made part of this Order by reference. The two disposal modules will ultimately consist of 18 cells (Cells 1A through 9A and 1B through 9B).
3. The Discharger's current plans indicate that the landfill will reach capacity by the year 2066. Site life calculations are based on a remaining refuse capacity as of 30 June 2008 of approximately 24,969,000 tons, which assumes a compacted refuse density of 1,395 pounds per cubic yard and accounts for settlement.
4. On 8 August 2008, the Discharger submitted an amended Report of Waste Discharge (RWD) as part of the Joint Technical Document (JTD) for the landfill. The information in the RWD/JTD has been used in writing these waste discharge requirements (WDRs).

The RWD contains the applicable information required in Title 27, California Code of Regulations (CCR), Chapter 4, Subchapter 3, Article 4. The RWD/JTD and supporting documents contain the following information related to this revision of the WDRs:

- a. Proposed addition of a biosolids management facility (BMF) which includes up to two Class II surface impoundments for dewatered sewage sludge storage and a Class II land treatment unit (LTU) within the permitted facility footprint.
 - b. Proposed recirculation of leachate and landfill gas condensate into the landfill mass as a leachate management strategy.
 - c. Proposed reduction of the Leachate Collection and Recovery System (LCRS) gravel thickness from 12-inches to 9-inches.
 - d. Information on management and disposal of treated wood and friable asbestos at the Class II Landfill.
 - e. Proposed changes to the monitoring and reporting program to reduce the frequency of groundwater monitoring and vadose zone monitoring from quarterly to semi-annual.
5. On 9 August 1996, the Regional Water Board issued previous WDRs Order No. 96-218, in which the facility was classified as a Class II waste disposal site for the discharge of municipal solid waste and designated wastes in accordance with the regulations in effect when the order was issued. In 2003, the Regional Water Board revised Order No. 96-218 in adopting Order No. R5-2003-0018 in response to a request from the Discharger to change the configuration of the landfill. On 23 June 2006, the Regional Water Board issued previous WDRs Order No. R5-2006-0068 in response to a request from the Discharger to increase the allowable depth of leachate on the liner system to allow for safe pumping operations as required by Title 27. This Order continues to classify the facility as a Class II landfill that accepts municipal solid waste (MSW) and designated wastes in accordance with Title 27, CCR, Section 20005, et seq. (Title 27).
 6. On 9 October 1991, the United States Environmental Protection Agency (USEPA) promulgated federal MSW regulations under the Resource Conservation and Recovery Act (RCRA), Subtitle D (Title 40, Code of Federal Regulations, Part 258), hereafter referred to as "Subtitle D". These regulations apply to all California Class II and Class III landfills which accept MSW.

SITE DESCRIPTION

7. The closest known faults are part of the Foothills fault zone located five miles east of the facility, which has an estimated maximum credible earthquake moment magnitude of 6.5. The facility is located on a thick sequence of soil. In addition, the motion along the Foothills fault zone is normal-slip and not strike-slip. Therefore, the calculated peak ground acceleration (PGA) is increased by 20 percent to account for the normal-slip

motion. This results in a design PGA of 0.36g based on a maximum credible earthquake (MCE).

8. Current land uses within 1,000 feet of the facility consist of active cattle grazing. Designated land uses surrounding the facility include Public to the north (Beale Air Force Base) and Potential Landfill and Landfill Buffer Area, and Valley Agriculture to the west, south and east. The nearest residence is located more than 2,000 feet west of the facility.
9. The facility receives an average of 25 inches of precipitation per year as measured at the Beale Air Force Base. The majority of the rainfall occurs between November and April. During the period between 1950 and 1997, a maximum annual precipitation of 46.3 inches was recorded in Marysville in 1983.
10. The 1000-year, 24-hour precipitation event is 5.8 inches, based on California Department of Water Resources' Rainfall Depth-Duration Frequency data for Beale Air Force Base (DWR #A00058400). Pan evaporation data recorded in Nicolaus located approximately 15 miles southwest of the facility from 1978 to 2006 (DWR) averaged 62.4 inches annually with an average minimum of 1.17 inches in December and an average maximum of 12.0 inches in July.
11. The facility is generally located adjacent to the 100-year flood plain based on the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map, Yuba County, Panel 400, May 17, 1982. Following the heavy storms in January 1997, high water marks adjacent to the landfill were staked. These elevations were approximately two feet higher than those indicated on the old FEMA map. Due to relatively limited hydrologic information for the general area, the recurrence time associated with the January 1997 storm is not known. As a result, the Discharger commenced a flood hazard study for the site. The results of the study concluded that the Discharger should maintain a minimum two-foot freeboard above the January 1997 high water elevations to ensure adequate flood protection from extreme flood events. To meet the recommended design elevation, two small segments of the southern perimeter road were raised by approximately one to three feet, and interim flood control measures were implemented by the end of 1997. The Discharger has reported that the minor perimeter improvements will have no significant impact on restricting the base flood flow or reducing the temporary water storage.
12. There are 31 municipal, domestic, industrial, or agricultural groundwater supply wells within one mile of the site. Three water supply wells (15NO5E-10Q1, 15NO5E-10Q2 and 15NO5E-15B1) are located adjacent to the western boundary of the landfill facility. Norcal Waste Systems, Inc. owns all three wells. Groundwater is periodically pumped from Well 15NO5E-10Q1 and used as dust control during construction activities and on the facility's dirt roads. The other two wells are not currently used.

WASTE CLASSIFICATION AND UNIT CLASSIFICATION

13. The Discharger discharges non-hazardous solid waste, inert wastes, and designated wastes to Class II landfill waste management units (WMUs). These wastes include municipal solid wastes, dewatered sewage sludge, industrial sludges, contaminated soil, dredge debris, slab/construction/demolition debris, treated wood, commercial/industrial wastes, and other non-hazardous or designated wastes. Wastes requiring special handling ("special wastes", as defined in Title 27) are also discharged to the landfill. These classified wastes may be discharged only in accordance with Title 27, California Code of Regulations (Title 27 CCR), Resolution No. 93-62, and the Code of Federal Regulations, Title 40, Part 258 as required by this Order.
14. The landfill currently accepts dewatered sewage sludge (biosolids) and proposes to accept semi-solid wastes and other wastes requiring special handling ("special wastes", as defined in Title 27). Wastes requiring special handling include food processing wastes, dead animals, agricultural wastes, tires, and ash.
15. The landfill accepts asbestos-containing wastes (ACW), consistent with Section 25143.7 of the Health and Safety Code and Section 17897 of Title 14 CCR.
16. The Discharger uses various non-hazardous and designated wastes accepted at the landfill as alternative daily cover (ADC) on landfill modules, including, construction and demolition (C&D) debris (which includes processed C&D fines and unders), green waste, sludge, contaminated soils, and shredded tires. Plastic tarps may be used as an ADC. These WDRs include a discharge specification requiring that, for each type of waste, the Discharger must first demonstrate that it does not pose a threat to water quality and meets the requirements for use as ADC under Title 27 CCR Section 20705.
17. The Discharger proposes to discharge treated wood waste. Title 22, CCR defines "Treated wood" to mean wood that has been treated with a chemical preservative for purposes of protecting the wood against attacks from insects, microorganisms, fungi, and other environmental conditions that can lead to decay of the wood and the chemical preservative is registered pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Sec. 136 and following). Section 67386.11 of Title 22 CCR allows treated wood waste to be disposed in a composite-lined portion of a municipal solids waste landfill that is regulated by WDRs issued pursuant to the California Water Code provided that the landfill:
 - a. Comply with the prohibitions in Section 67386.3 of Title 22 CCR, which are:
 1. Treated wood waste shall not be burned, scavenged, commingled with other waste prior to disposal, stored in contact with the ground, recycled without treatment (except as in 3, below), treated except in compliance with Section 67386.10, or disposed to land except in compliance with Section 67386.11;
 2. Any label or mark that identifies the wood and treated wood waste shall not be removed, defaced, or destroyed;

3. Treated wood waste may be recycled only by reuse when all of the following apply:
 - A. Reuse is onsite;
 - B. Reuse is consistent with FIFRA approved use of the preservative;
 - C. Prior to reuse, treated wood waste is handled in compliance with Title 22 CCR, Division 4.5, Chapter 34.
 - b. Ensure treated wood waste is managed at the landfill according to Title 22, Division 4.5, Chapter 34 prior to disposal;
 - c. Monitor the landfill for a release and cease discharge of treated wood waste at that portion of the landfill until corrective action results in cessation of the release;
 - d. Handle treated wood waste in a manner consistent with the applicable sections of the California Occupational Safety and Health Act of 1973.
18. In addition to waste disposal operations, the Discharger proposes to accept and store de-watered sewage sludge in Class II surface impoundment(s) in Cell 8A of the BMF. Cell 8A may include up to two 5-acre Class II surface impoundments in which each surface impoundment can store up to 25,000 tons of sludge during the winter months. The sewage sludge is stored in the surface impoundment(s) during the wet season and removed from the module to the drying area at the beginning of the dry season. The Class II surface impoundment(s) are contained within the permitted footprint of the Class II landfill and will be clean-closed as the site is developed.
19. The Discharger proposes to conduct sludge drying operations in a 10.5-acre area in Module 2 (see Attachment B). Prior to application of waste, the Discharger shall operate a test plot for a sufficient period to give the Regional Water Board a reasonable indication that degradation, transformation, or immobilization will take place in the treatment zone (Title 27 CCR 20250(b)(5)). The drying area shall be constructed, operated and monitored as a Land Treatment Unit per Title 27 CCR Sections 20250(b)(5), 20377 and 20380.

SURFACE WATER AND GROUNDWATER CONDITIONS

20. The *Water Quality Control Plan for the Sacramento River Basin and San Joaquin River Basin, Fourth Edition* (hereafter Basin Plan), designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin.
21. Surface water drainage from the site is primarily to the south towards Best Slough, which borders the southern end of the landfill property. A small portion of the northwestern part of the site drains to Hutchinson Creek, which flow northward through Beale Air Force Base. Both of these streams eventually flow into the Sacramento River.

22. The designated beneficial uses of Sacramento River, as specified in the Basin Plan, are municipal and domestic supply, agricultural irrigation supply, stock watering, hydroelectric power generation, recreation, freshwater habitat, fish migration and spawning, wildlife habitat, ground water recharge, fresh water replenishment, preservation of rare and endangered species, and esthetic enjoyment.
23. The designated beneficial uses of the groundwater, as specified in the Basin Plan, are domestic and municipal supply, agricultural supply, and industrial supply
24. The first encountered groundwater in the continuous water bearing zone is approximately 42 to 90 feet below ground surface (bgs). Groundwater elevations currently range from approximately 80 feet above mean sea level (MSL) to 100 feet MSL. Groundwater is generally unconfined, although some localized confinement can occur. Historical groundwater data from 1913 indicates that prior to agricultural development, groundwater was encountered approximately 20 to 30 feet bgs. Following the extensive development of irrigation in the late 1940's, overdraft of groundwater supplies caused groundwater levels in the area to decline greatly. In 1983, surface water was introduced as a source for irrigation and groundwater levels have subsequently increased. At the current rebound rate, groundwater levels may reach pre-development levels in less than 15 years. The historical water levels in 1948 are an appropriate estimate of the highest anticipated groundwater for the landfill.
25. Based on grain-size distribution tests completed on soils at the site, the estimated capillary rise is 2.5 feet for sandy clay soils and 0.1 to 2.5 feet for sandy and gravelly soils with varying amounts of silts and clays. The estimated average capillary rise across the site at any point in time is approximately 2.5 feet.
26. Groundwater below the site occurs in coarse-grained units at depths ranging from 5 to 80 feet bgs. Groundwater flow is generally toward the west with a groundwater gradient in the active area of the landfill of approximately 0.007 (32 feet per mile). Perched water occurs in some areas. Recharge is believed to occur from Best Slough and the areas east of the site.
27. Shallow perched groundwater near the landfill appears to be of limited lateral extent. A zone of perched water is located near Piezometer PZ-11, which was installed near the northern side of the landfill in October 2001. The piezometer is screened from 10 to 20 feet bgs in a sand and gravel layer and 0.2 to 5.0 feet of water has been detected in the piezometer since its installation in October 2001. Piezometers PZ-12 and PZ-13, which were also installed near the northern side of the landfill, have generally been dry since their installation in October 2001 and June 2002, respectively.

GROUNDWATER AND UNSATURATED ZONE MONITORING

28. The facility's current groundwater monitoring network (as shown in Attachment C, which is incorporated herein and made part of this Order by reference) consists of three upgradient background wells (MW-1, MW-2, and MW-3) and eight (8) downgradient detection monitoring wells (MW-4, MW-5, MW-6, MW-7, MW-8, MW-16, T-1, and T-2).

29. As the landfill has expanded eastward, waste has been placed in a unit (Cell 2A) adjacent to well MW-2. While there are currently no indications of impacts to well MW-2, its spatial location is currently cross-gradient and/or downgradient from waste rather than upgradient. The Discharger recommends transferring well MW-2 to the detection-monitoring program, and wells MW-1 and MW-3 should continue to be designated as background wells.
30. Monitoring data indicates background groundwater quality in the continuous water-bearing zone has an electrical conductivity (EC) ranging between 160 and 490 micromhos/cm, with total dissolved solids (TDS) ranging between 140 and 270 mg/l.
31. Volatile organic compounds (VOCs) are often detected in a release from a landfill, and are the primary waste constituents detected in groundwater beneath a municipal solid waste landfill (see Finding No. 36). Since volatile organic compounds are not naturally occurring and thus have no background value, they are not amenable to the statistical analysis procedures contained in Title 27 CCR for the determination of a release of wastes from a Unit.
32. Sections 20415(e)(8) and (9) of Title 27 CCR provide for the non-statistical evaluation of monitoring data that will provide the best assurance of the earliest possible detection of a release from a Unit in accordance with Section 20415(b)(1)(B)2.-4. of Title 27 CCR. However, Title 27 does not specify a specific method for non-statistical evaluation of monitoring data.
33. The Regional Water Board may specify a non-statistical data analysis method pursuant to Section 20080(a)(1) of Title 27 CCR. Section 13360(a)(1) of the California Water Code allows the Regional Water Board to specify requirements to protect underground or surface waters from leakage from a solid waste site, which includes a method to provide the best assurance of determining the earliest possible detection of a release.
34. In order to provide the best assurance of the earliest possible detection of a release of non-naturally occurring waste constituents from a Unit, this Order specifies a non-statistical method for the evaluation of monitoring data.
35. The specified non-statistical method for evaluation of monitoring data provides two criteria (or triggers) for making the determination that there has been a release of non-naturally occurring waste constituents from a Unit. The presence of two non-naturally occurring waste constituents above their respective method detection limit (MDL), or one non-naturally occurring waste constituent detected above its practical quantitation limit (PQL), indicates that a release of waste from a Unit has tentatively occurred. Following a tentative indication of a release, verification testing will be conducted to determine whether there has been a release from the Unit, or there is a source of the

detected constituents other than the landfill, or the detection was a false detection. Although the detection of one non-naturally occurring waste constituent above its MDL is sufficient to provide for the earliest possible detection of a release, the detection of two non-naturally occurring waste constituents above the MDL as a trigger is appropriate due to the higher risk of false-positive analytical results and the corresponding increase in sampling and analytical expenses from the use of one non-naturally occurring waste constituent above its MDL as a trigger.

WATER QUALITY DEGRADATION AND CORRECTIVE ACTION PROGRAM

36. VOCs and elevated concentrations of total dissolved solids (TDS), chloride and metals have been detected in Pan Lysimeter PL-1A which is directly overlain by leachate Sump 1A on the north side of Landfill Cell 1A. In September 2000, the Discharger began implementation of an Evaluation Monitoring Program (EMP) to assess the nature and extent of the release from the sump. The results of the EMP and associated integrity testing of the composite liner (geomembrane and geosynthetic liner) located between Pan Lysimeter PL-1A and Sump 1A are presented in the Discharger's January 2001 Engineering Feasibility Study (EFS). The results of the integrity test show that there is a leak between the sump and the pan lysimeter. The leak may be due in part to a defect in a retrofitted boot sleeve that envelops the Pan Lysimeter PL-1A riser access pipe and/or defect(s) in the composite liner. Due to reconstruction of the sump at a higher elevation in 1998, Pan Lysimeter PL-1A is underlain by fill and the original 2-foot thick low-permeability clay liner underneath which is located Suction Lysimeter VZ-2. In the July 2008 sampling event, PL-1A had a concentration of 1,4-dichlorobenzene of 2.5 ug/L, above the practical quantitation limit.
37. Data collected from Suction Lysimeter VZ-2 show a statistically significant upward trend for chloride. Chloride has been detected at a maximum concentration of 52 mg/L, which exceeds the concentration limit of 4.1 mg/l. In addition, the VOC chloromethane was detected at trace concentrations. In response, Piezometer PZ-13 was installed in June 2002 adjacent to the riser pipe for Pan Lysimeter PL-1A to monitor for potential leachate leakage from Sump 1A into the unsaturated zone and shallow ephemerally perched groundwater. Piezometer PZ-13 has had water present for sample collection intermittently (first quarter 2004 and second quarter 2006). In the first quarter of 2004, VOCs were detected in Piezometer PZ-13 (1,1-DCA at 1.2 ug/L, MTBE at 5.2 ug/L, and six others at trace levels). In the second quarter 2006, inorganic sample results for Piezometer PZ-13 were lower than those in 2004, indicating that operation of the additional Landfill Gas (LFG) extraction wells along the northern boundary of Cell 2 has had a positive effect.
38. Results of general parameters and lack of VOCs detected in the fourth quarter 2007 sampling of Suction Lysimeter VZ-2 indicate that water from Pan Lysimeter PL-1A has not impacted underlying water in the vicinity of this unsaturated zone monitoring point.
39. In the first quarter 2006, water was detected for the first time in pan lysimeter PL-1B on the south side of Landfill Cell 1B. Initial monitoring results included elevated

concentrations of EC, TDS, and bicarbonate alkalinity, and VOC concentrations above the reporting limit. Based on these results, a recommendation to transfer Pan Lysimeter PL-1B to the corrective action monitoring program was made. In 2006, the Discharger investigated the source of the liquid in Pan Lysimeter PL-1B and based on observations of the pipe boot and liner termination concluded that the pipe boot might not have been completely sealed. Additional sealing of the exposed area was completed, and a layer of bentonite was placed around the pipe boot. Concentrations of most organic constituents in Pan Lysimeter PL-1B have decreased (chloride, sulfate, and TDS) since the first quarter 2006, though bicarbonate remains elevated. One VOC, methyl tert-butyl ether (MTBE) was detected in the fourth quarter of 2007 and the second quarter of 2008 above the reporting limit at concentrations of 5.5 ug/l and 2.2 ug/L, respectively. The number and concentrations of VOCs detected in the fourth quarter of 2007 are lower than past quarters.

40. A release of VOCs has occurred from Landfill Cell 2A. In April 2001, liquid containing VOCs at concentrations up to 20 µg/L was detected in Pan Lysimeter PL-2A which is located beneath Sump 2A on the north side of Cell 2A. In August 2001, the Discharger began implementation of an EMP to evaluate the possible sources of liquids and VOCs detected in Pan Lysimeter PL-2A. To evaluate the potential source of liquids in PL-2A, two piezometers (PZ-11 and PZ-12) were installed along the north side of Cell 2 and liquid levels in PL-2A and Sump 2A were evaluated. Both piezometers were screened in a sand and gravel layer from approximately 10 to 20 feet bgs. To evaluate the potential source of VOCs in PL-2A, two soil probes were advanced approximately 25 to 30 feet north of Cell 2 and soil gas samples were obtained from depths of approximately 10 feet bgs.
41. The preliminary results of the EMP and a description of the specific hydrogeologic conditions and proposed corrective action measures are described in the Discharger's November 2001 proposed EFS. Data collected as a part of the EMP and from investigations conducted for the EFS show the presence of VOCs in soil gas in shallow soils approximately 25 to 30 feet north of landfill Cell 2. In addition, VOCs have been detected in liquids from Piezometer PZ-11. In November 2001, Regional Board Staff requested a revised EFS which incorporates the necessary gas control measures and describes the proposed installation of dedicated sump pumps with automated fluid level switches in Sumps 1A and 2A and transducers in pan lysimeters PL-1A and PL-2A. The Discharger submitted a workplan for interim landfill gas control measures to control the source of landfill gas (LFG) impacting the vadose zone. An amended version to the workplan was approved on 5 June 2002. The interim measures were designed to reduce LFG pressure and gas-phase concentrations of VOCs in the leachate collection and removal layer at the bottom of the landfill cells by connecting a LFG extraction system to sump risers and cleanout pipes in Cells 1 and 2.
42. Interim landfill gas control measures commenced on 30 October 2002 in accordance with an approved workplan. Additional landfill gas measures were implemented in 2006 and 2007 in accordance with New Source Performance Standards (NSPS) as required by the Feather River Air Quality Management District. Operation of the landfill gas

collection system is a required corrective action measure to reduce gas-phase concentrations of VOCs that have been detected in the unsaturated zone. Landfill gas is extracted from the LCRS through the sump risers, the geonet drainage layer, and thirteen in-waste landfill gas extraction wells in Cells 1 and 2. The extracted landfill gas is currently flared; however, a landfill gas-to-energy facility is currently under construction at the facility. To evaluate the effectiveness of the gas control system, gas samples are obtained from the designated corrective action monitoring points at least quarterly and monitored for methane, carbon dioxide and oxygen. Additional gas extraction and control systems will be installed in future cells as the landfill expands as required by NSPS.

43. Corrective action measures for the releases from Landfill Cells 1A and 2A consist of implementation of landfill gas control measures described in Finding No. 42 and an automated leachate extraction system in Sumps 1A and 2A. Operation of the landfill gas control system commenced on 30 October 2002. Automated pumping systems have also been installed in both leachate sumps. Pressure transducers have been installed in underlying Pan Lysimeters PL-1A and PL-2A allowing for automated measurements of liquid levels above the base of the pan lysimeters. A *Corrective Action Assessment Report*, which presented an assessment of the interim corrective action measures was submitted on 24 May 2004. Improvements to the landfill gas control system have been made to increase the system's collection capacity. A total of thirteen in waste extraction wells (EW-1 through EW-13), two perimeter extraction wells (PEW-1 and PEW-2), and two additional LCRS risers (Sumps 1B and 2B) have been installed and tied into the LFG extraction system. The Discharger has constructed an enclosed flare to replace the candlestick flare used to dispose of landfill gas. Expansion of the gas control system will continue as the site is developed. Water monitoring results collected in 2007 indicate that operation of the existing LFG control system has reduced the overall number and concentration of VOCs detected in shallow groundwater, the unsaturated zone, and has resulted in a reduction in some of the VOCs in the leachate.
44. The Monitoring and Reporting Program describes the corrective action monitoring that is required to demonstrate the effectiveness of the corrective action measures per Title 27 CCR, Section 20430, as well as concurrent detection monitoring to provide the best assurance of the detection of potential subsequent releases per Title 27 CCR, Section 20385(c) and Section 20420. The Discharger must demonstrate that the facility complies with its Water Quality Protection Standard, including any applicable concentration limits greater than background, before the facility can cease corrective action monitoring and return to facility-wide detection monitoring.

LINER PERFORMANCE DEMONSTRATION

45. On 15 September 2000 the Regional Water Board adopted Resolution No. 5-00-213 Request For The State Water Resources Control Board To Review The Adequacy Of The Prescriptive Design Requirements For Landfill Waste Containment Systems To Meet The Performance Standards Of Title 27 CCR. The State Board responded, in part,

that “a single composite liner system continues to be an adequate minimum standard” however, the Regional Water Board “should require a more stringent design in a case where it determines that the minimum design will not provide adequate protection to a given body of groundwater.”

46. In a letter dated 17 April 2001, the Executive Officer notified Owners and Operators of Solid Waste Landfills that “the Regional Water Board will require a demonstration that any proposed landfill liner system to be constructed after 1 January 2002 will comply with Title 27 CCR performance standards. A thorough evaluation of site-specific factors and cost/benefit analysis of single, double and triple composite liners will likely be necessary.”
47. On 1 October 2002, the Discharger submitted a *Liner Performance Demonstration Report Future Class II Liner Systems, Ostrom Road Landfill*. A full double composite liner system is proposed for future landfill cells at the landfill unless a site-specific demonstration is conducted which demonstrates that the prescriptive standard or another design complies with the Title 27 CCR performance standard. The proposed containment system for the floor of all future Class II landfill cells consists of the following components from top to bottom:
- Operations layer (12-inch minimum thickness);
 - 8-oz. geotextile filter layer;
 - LCRS gravel layer (12-inch minimum thickness);
 - Primary 60-mil HDPE geomembrane;
 - 2.5-foot thick CCL with a permeability of 1×10^{-7} cm/s or less (the lower 6-inches is not subject to the permeability requirements);
 - Leak detection geocomposite;
 - Secondary 60-mil HDPE geomembrane liner; and
 - Compacted subgrade comprised of soils classified as CL, CH, or SC per the Unified Soil Classification System (USCS)

The containment system for the side slope areas of all future Class II landfill cells is as follows (from top to bottom):

- Operations layer (12-inch minimum thickness);
- 8-oz geocomposite filter/geonet;
- 60-mil textured HDPE geomembrane;
- Minimum 24-inches of low permeability compacted soil liner;

The Discharger will provide comprehensive construction quality control during the liner system construction, complete an electrical leak location survey to verify the integrity of the primary liner system, and install LFG collection pipes within the LCRS to control LFG in the future, if necessary.

48. The liner demonstration report compared efficiencies and leakage potential of six different liner system designs. A total leakage potential of 0.8 gallons/acre/day was calculated throughout the life of the landfill (operations and 30-year post-closure period)

based on a hypothetical 15-acre cell. In addition, a cost-benefit analysis was performed which showed that additional liner components would cost significantly more without significantly less leakage potential. As such, the demonstration concluded that a more stringent liner system is not warranted since the proposed system will meet the performance requirements of Title 27 CCR because it exemplifies the prescriptive standard with an additional leak detection component.

CONSTRUCTION AND ENGINEERED ALTERNATIVE

49. On 17 June 1993, the State Water Resources Control Board adopted Resolution No. 93-62 implementing a State Policy for the construction, monitoring, and operation of municipal solid waste landfills that is consistent with the federal municipal solid waste regulations promulgated under Title 40, Code of Federal Regulations, Part 258 (Subtitle D).
50. Resolution No. 93-62 requires the construction of a specified composite liner system at new MSW landfills, or expansion areas of existing MSW landfills, that receive wastes after 9 October 1993.
51. Resolution No. 93-62 also allows the Regional Board to consider the approval of engineered alternatives to the prescriptive standard. Section III.A.b. of Resolution No. 93-62 requires that the engineered alternative liner systems be of a composite design similar to the prescriptive standard.
52. Title 27 CCR Section 20080(b) allows the Regional Board to consider the approval of an engineered alternative to the prescriptive standard. In order to approve an engineered alternative in accordance with Title 27 CCR 20080(c)(1) and (2), the Discharger must demonstrate that the prescriptive design is unreasonably and unnecessarily burdensome and will cost substantially more than an alternative which will meet the criteria contained in §20080(b), or would be impractical and would not promote attainment of applicable performance standards. The Discharger must also demonstrate that the proposed engineered alternative liner system(s) is consistent with the performance goal addressed by the particular prescriptive standard, and provides protection against water quality impairment equivalent to the prescriptive standard in accordance with Title 27 CCR Section 20080(b)(2).
53. Section 13360(a)(1) of the California Water Code allows the Regional Water Board to specify the design, type of construction, and/or particular manner in which compliance must be met in waste discharge requirements or orders for the discharge of waste at solid waste disposal facilities.
54. The Discharger proposes a liner system which will be designed, constructed, and operated in accordance with the criteria set forth in Title 27 CCR, and the provisions in State Water Resources Control Board Resolution No. 93-62 for municipal solid wastes.
55. Title 27 CCR Section 20240 (c) requires that new landfills, waste piles and surface impoundments be "sited, designed, constructed and operated", to ensure or maintain at

least five feet of separation between the contained wastes and the highest anticipated level of the groundwater table. Existing WMUs are to be "operated" to maintain the required separation.

Engineered Alternative Design for Separation from Groundwater

56. In the 1 October 2002, *Liner Performance Demonstration Report Future Class II Liner Systems, Ostrom Road Landfill*, the Discharger requested approval of an engineered alternative design (EAD) to the Title 27 CCR prescriptive standard which specifies that a minimum of five (5) feet of separation shall be maintained between waste and the highest anticipated elevation of underlying groundwater including the capillary fringe. The EAD proposed by the Discharger to mitigate the groundwater separation requirement consists of a 60-mil HDPE geomembrane, which will be installed beneath the **entire** base composite liner system to create a barrier to groundwater or capillary rise. Up to approximately 15% of the landfill (primarily in the vicinity of proposed Phase 4 of Cell 1) may have groundwater separation distances of 2.5 to 5 feet between wastes and the highest anticipated groundwater including capillary rise. The geomembrane will be overlain by a leak detection geocomposite and a prescriptive composite liner system and will serve as an integral part of the liner system. The leak detection geocomposite will extend to the leak detection monitoring sump described in Finding 59.
57. The Discharger has demonstrated in the EAD that the prescriptive standard requiring a minimum of five (5) feet of separation between the waste and the highest anticipated elevation of underlying groundwater would be unreasonable and unnecessarily burdensome. Meeting the prescriptive groundwater separation requirements would require the establishment of an interior sump located away from the landfill perimeter. These sumps are undesirable due to poor access and greater susceptibility of sump access to impacts by refuse settlement. The Discharger has demonstrated that the proposed EAD is consistent with the performance goals of the prescriptive standard and affords equivalent protection against water quality impairment.

Leachate Control and Recovery System

58. The Discharger has demonstrated in the JTD that the 9-inch thick LCRS can collect and remove 45 times the anticipated peak daily leachate volume. The LCRS in all future cells will consist of a 9-inch thick gravel blanket drain blanket sloping at 1 to 2 percent to a central perforated header pipe which will drain with a minimum slope of 0.5 percent to the LCRS sumps. The LCRS gravel will be overlain by a filter geotextile. The central head collection pipes will be placed within the 9-inch thick gravel blanket drain. The pipes for future modules will be 6-inch diameter, HDPE with a size-dimension ratio (SDR) of 11. The LCRS gravel or an equivalent drainage media will provide a minimum hydraulic conductivity of 1 cm/sec. A peak leachate generation rate of 350 gallons/acre/day has been reported as the maximum anticipated leachate flow during the operational life of the facility.

59. Each of the LCRS sumps in future cells will be designed with a leak detection monitoring sump below the primary base liner system. The leak detection monitoring sump will be excavated into the subgrade below the LCRS sump at the lowest point of the module floor. Access to the leak detection sump will be via a slope riser pipe. Any liquids in the leak detection monitoring sump will be removed with a pump via the slope riser pipe.
60. Pan lysimeters are installed beneath the liner system for the purposes of unsaturated zone monitoring. The pan lysimeter(s) consist of: 1) an underlying 60-mil HDPE liner on a prepared subgrade below the leachate sump(s); 2) a lysimeter geocomposite overlain by a 12-inch diameter perforated HDPE pipe (connected to a 12-inch diameter solid HDPE lysimeter riser pipe) covered by 18-inches of drainage rock; 3) and a 60-mil HDPE leak detection system geomembrane covering the pan lysimeter(s).

LANDFILL MODULES

61. Approximately 52 acres out of the total 225-acre landfill footprint have been constructed to date. The existing and proposed modules at the facility are described as follows:

Modules	Classification	Description of Construction	Status
Cell 1, Phase 1-2 and Cell 2, Phase 1-2	Class II	<p>Base floor liner consists of from top to bottom: 12-inches of operations soil; 8-oz. geotextile filter fabric; 12-inch thick LCRS¹; 60-mil HDPE geomembrane and; 24-inches of low-permeability soil liner².</p> <p>Side slope liner system consists of from top to bottom: 24-inches of operations soil; LCRS geocomposite drainage layer; 60-mil HDPE geomembrane and; 24-inches of low-permeability soil liner.</p>	Active
Cell 2, Phase 3	Class II	<p>Base floor liner consists of from top to bottom: 12-inches of operations soil; a 8-oz. geotextile filter fabric; 12-inch thick LCRS; 60-mil HDPE geomembrane, 30-inches of low-permeability soil liner, 8-oz leak detection geocomposite; 60-mil HDPE geomembrane and; 24-inches of low-permeability soil liner.</p> <p>Side slope liner system consists of from top to bottom: 24-inches of operations soil; LCRS geocomposite drainage layer; 60-mil HDPE geomembrane and; 30-inches of low-permeability soil liner.</p>	Active
Cell 1, Phase 4, Cell 3, Phase 1 and Cell 2, Phase 4	Class II	<p>Base floor liner consists of from top to bottom: 12-inches of operations layer; a 8-oz. geotextile filter; 12-inch thick LCRS Gravel; 60-mil textured HDPE geomembrane, minimum 24-inches of low-permeability soil ($k \leq 1 \times 10^{-7}$ cm/s); plus additional 6-inches of "foundation" over secondary geosynthetic layers; geocomposite leak detection layer; 60-mil textured³ HDPE geomembrane; and subgrade.</p> <p>Side slope liner system consists of from top to bottom: 24-inches of operations layer; LCRS geocomposite drainage layer; 60-mil textured HDPE geomembrane; minimum 24-inches of low-permeability soil ($k \leq 1 \times 10^{-7}$ cm/s); plus an additional 6-inches of "foundation" over the secondary geosynthetic layers; secondary 60-mil textured³ HDPE geomembrane; and subgrade.</p>	Active
Future Cells 3B-9B	Class II	Same as described above for Cell 1, Phase 4, except that LCRS minimum thickness shall be 9-inches.	Proposed

1. Permeability greater than or equal to 1 cm/s.
2. Permeability less than or equal to 1×10^{-7} cm/s.
3. Not required by WDRs.

BIOSOLIDS MANAGEMENT FACILITY

Class II Surface Impoundments

62. In addition to waste disposal operations, the Discharger proposes to operate a temporary BMF, which could include up to two 5-acre Class II surface impoundments located in Cell 8A. Initially, the Discharger plans to construct only one surface impoundment. A second surface impoundment would be added if biosolids demand is sufficient to make it economically viable. The facility would accept and store up to 25,000 tons of de-watered sewage sludge in the surface impoundment(s) during the winter months and conduct sludge drying operations in the adjacent LTU during the dry season. This facility is temporary in that it will be clean-closed as the landfill development proceeds westward.
63. The Title 27 CCR prescriptive liner requirement for a Class II surface impoundment is a double liner system consisting of two layers of compacted clay that are two feet thick and have a hydraulic conductivity of 1×10^{-6} cm/s or less. An LCRS is required between the clay liners.
64. The Discharger proposes an engineered alternative to the prescriptive liner requirements of Title 27 CCR for the Class II surface impoundment. The engineered alternative consists of the following components from the top to bottom:
- 1.5 feet of operation soil;
 - Primary 60-mil textured HDPE Geomembrane;
 - Geonet or Geocomposite leak detection layer;
 - Secondary 60-mil textured HDPE Geomembrane; and
 - 1 foot of low-permeability soil liner ($k \leq 1 \times 10^{-6}$ cm/s).

Additional design features of the Class II surface impoundment include:

- A minimum freeboard of 2 feet to accommodate precipitation;
- A leak detection sump to monitor and extract liquids from the leak detection layer. Extracted liquids will be pumped back into the surface impoundment. An action leakage rate (ALR) of 500 gallons per/day is proposed in which leakage rates greater than the ALR will trigger an investigation to find the source of the leak(s) in the primary liner, and then implementation of corrective actions to repair the leak(s).
- A pan lysimeter will be located below the leak detection sump to monitor the unsaturated zone.
- If necessary, excess liquids will be pumped from the impoundment and stored in tanks until it can be transported to the Marysville wastewater treatment plant for disposal.

Land Treatment Unit

65. The LTU area comprises 10.5-acres located in Cell 7A and the southern portion of Cell 8A (see Attachment B).
66. The near surface soils below the LTU consist of fined-grained silts and clays that have low permeability. The upper soils consist of one to two feet of clayey silts overlying one to three feet of a low to high plasticity clay. These soils are anticipated to be able to contain the biosolids constituents within the upper 5-feet of the soils, which is the maximum depth of the LTU zone.
67. Groundwater beneath the BMF area currently occurs at a depth of approximately 50 feet bgs.

FACILITIES OPERATION

Landfill

68. The refuse fill is placed in lifts 10 to 15 feet thick. Refuse is spread and compacted in 2-foot-thick layers on a 5:1 to 3:1 (maximum) sloped working face, consistent with optimum slope angles for landfill compaction equipment operation. At the end of each working day, the active working face is covered with 6-inches of on-site soil or ADC material. One foot of soil is placed on any area that will not receive wastes for 180 days. Surface grading is maintained at all times to insure lateral runoff and to prevent ponding over areas in which waste is buried.
69. Daily cover and/or ADC are placed on the active face in accordance with the requirements of Title 27 CCR Sections 20680 and 20690. ADC materials that may be used include, but are not limited to, construction and demolition (C&D) debris (which includes processed C&D fines and unders), green waste, sludge, contaminated soils, shredded tires, and plastic tarps. Geosynthetic fabric, blankets, and foam products may also be used as ADC. All ADC materials are stockpiled within the module where they will be used.
70. The RWD/JTD includes information on the overall soil balance and the amount of soil material needed for future landfill construction activities and operations. The Discharger estimates that there is about 285,636 cubic yards of excess soil available for liner construction, daily and intermediate cover, and final cover through closure in 2066.
71. The RWD/JTD includes information on LCRS design and leachate management. The recorded peak leachate generation rate for the site is approximately 350 gallons/acre/day. The JTD has showed that the LCRS had a capacity of 60 times this maximum historical flow rate for a 12-inch thick LCRS and 45 times this maximum historical flow rate for a nine-inch LCRS. Leachate and landfill gas condensate is currently pumped from the landfill sumps to onsite tanks. The tanks are drained into tanker trucks for transport to the City of Marysville wastewater treatment plant for

disposal or used onsite on lined areas for dust control during the dry season (between 15 April and 15 October).

Surface Impoundments

72. During the wet season, incoming de-watered sewage sludge is directed to the Class II surface impoundment for storage until the dry season.
73. Biosolids from the Class II surface impoundment will either be pumped with sludge pumps or excavated and transported to the LTU for drying.

Land Treatment Unit

74. The Discharger proposes to conduct sludge drying operations during the dry season (typically between April 15th and October 15th) in the 10.5-acre LTU located in Cell 7A and the southern portion of Cell 8A. The start of drying season may be delayed after April 15th or the end of drying season terminated before October 15th based on actual weather conditions. Drying will involve spreading the biosolids into lifts of approximately 12-inch layers until the layer dries sufficiently for its intended use. At the end of drying season, all biosolids material will be removed from the LTU and soil samples taken from below the LTU to confirm that waste constituents have not migrated below the LTU. A perimeter drainage ditch will be constructed around the LTU to control surface water run-on and run-off. The ditch will discharge into a grass-lined swale that will eventually drain to Best Slough.
75. The LTU is to be used only during the dry season and only for drying de-watered sewage sludge.
76. Prior to application of waste, the Discharger shall operate a test plot for a sufficient period to give the Regional Water Board a reasonable indication that degradation, transformation, or immobilization will take place in the treatment zone (Title 27 CCR 20250(b)(5)). The drying area shall be constructed, operated and monitored as a Land Treatment Unit per Title 27 CCR Sections 20250(b)(5), 20377 and 20380.
77. All containment structures shall be designed and constructed under the direct supervision of a California registered civil engineer or certified engineering geologist and shall be certified by that individual as meeting the prescriptive standards and performance goals of Title 27 prior to waste discharge.
78. Construction will proceed only after all applicable construction quality assurance plans have been approved.
79. The LTU is monitored as described in the attached monitoring and reporting program.
80. Sewage sludge will either be pumped with sludge pumps, or excavated and transported to the LTU at the beginning of each dry season for drying. Any incoming sludge will also be directed to the LTU during the dry season. Drying will involve spreading the sludge

into lifts of approximately 12-inches and periodically disked to promote drying until the layer dries sufficiently for its intended use. Once dried, the sludge is removed as needed for ADC, composting, cover amendment, or manufacturing soil.

81. The proposed soil manufacturing operations will be conducted during the dry season within the LTU area. The manufactured soil will consist of an approximate mixture of the following; dried sludge (60%), compost overs (20%) and onsite soil (20%), or only dried sludge (70%) and soil (30%). Once mixed, the soil is stockpiled next to the module where it is needed for construction operations. For modules not scheduled for construction that year, the stockpiles are to be winterized prior to the wet season by grading and capping them (with a one-foot layer of clay) for drainage and erosion control.

LEACHATE AND CONDENSATE MANAGEMENT

82. As part of the amended RWD/JTD submitted on 8 August 2008, the Discharger requested to be allowed to recirculate leachate and landfill gas condensate into the landfill mass as a leachate management strategy and in order to reduce leachate and condensate management costs for these liquids. The Discharger states that this technique has been documented as beneficial in improving leachate quality, faster degradation of organic pollutants, reducing greenhouse gas, and particulate and diesel emissions due to reduced trucking of the leachate.
83. The Discharger has requested to be allowed to discharge leachate into a different unit than from which it came. Title 27 CCR 20340(g) states that: *"Except as provided under State Water Board Resolution No. 93-62 (for MSW landfills subject to 40CFR 258.28), collected leachate shall be returned to the unit from which it came or discharged in another manner approved by the RWQCB."* 40CFR 258.28 states that liquid waste may not be placed in MSW landfill units unless the waste is leachate or gas condensate derived from the landfill unit and it is designed with a composite liner and leachate collection system. Title 27 CCR 20340(g) allows for collected leachate to be discharged to a different unit only if:
 - a. the receiving unit has an LCRS, contains wastes which are similar in classification and characteristics to those in the unit(s) from which the leachate was extracted, and has at least the same classification as the unit(s) from which the leachate was extracted;
 - b. the discharge to a different unit is approved by the RWQCB;
 - c. the discharge of leachate to a different unit shall not exceed the moisture holding capacity of the receiving unit, and shall comply with Title 27 CCR 20200(d).
84. Therefore, leachate and landfill gas condensate from composite lined units at the landfill may be returned to different unit(s) from which it came provided that the unit(s) are similar in classification and characteristics to those unit(s) from which the leachate was extracted, and has at least the same classification as the unit(s) from which the leachate

85. This Order allows the Discharger to recirculate leachate and landfill gas condensate into the landfill mass as a leachate management strategy. Calculations by the Discharger indicate that the facility has sufficient capacity to recirculate onsite leachate for the subject modules. For Cells 1A/2A some offsite disposal is required for average flow conditions during the winter months. If leachate flows from Cells 1A/2A approach or exceed 5,000 gallons per day (gpd), the Discharger shall immediately install a larger pump such that leachate flows are less than 85 percent of the pump capacity, or leachate recirculation in these cells should cease immediately and the leachate pumped to existing onsite storage tanks. For Cells 1B/2B, calculations by the Discharger indicate that unless the leachate recirculation gallery can be significantly increased in the fill sequence planning for Cells 1B/2B, offsite disposal will be required year round from these modules.

CLOSURE AND, POST-CLOSURE MAINTENANCE

Landfills

86. The Discharger submitted a May 2002 Joint Technical Document that included a preliminary closure and post-closure maintenance plan (PCPCMP) for the facility. Under the PCPCMP, final cover will be constructed over the waste as part of the closure activities. The maximum height for the closed facility, including final cover, is 365 feet mean sea level (MSL), which corresponds to a height of 255 feet above grade (using a reference ground elevation of 110 ft MSL). The final cover side slopes will have a maximum slope of 3:1 (horizontal-to-vertical), with 20-foot wide benches at intervals not exceeding 50 feet vertically. The crest will have a minimum slope of five percent to ensure adequate drainage and control erosion.
87. The prescriptive standard under Title 27 CCR for final cover for landfill closure is as follows:
- One foot vegetative cover soil (erosion-resistant/vegetative cover layer);
 - 60-mil HDPE geomembrane;
 - One foot of compacted soil ($k \leq 1 \times 10^{-6}$ cm/sec) (low hydraulic conductivity layer);
 - Two feet of compacted soil (foundation layer).

Title 27 CCR and Resolution 93-62 further require that the permeability of the low conductivity/infiltration layer be no greater than that of the base liner (T27, Section 21090(a)(2), Subtitle D, Section 258.60(a)(1)) in order to prevent a “bathtub effect”.

88. The Discharger proposes an engineered alternative final cover design as follows:

For the top deck areas of the landfill consisting of (from top to bottom):

- A one-foot thick vegetative soil layer;
- A 60-mil HDPE geomembrane;
- A low-permeability geosynthetic clay layer (GCL); and
- A one-foot thick foundation layer.

The side slope design includes (from top to bottom):

- A one-foot thick vegetative soil layer;
- A geocomposite drainage layer;
- A 60-mil HDPE geomembrane; and
- A one-foot thick foundation layer.

The Discharger has previously made the demonstration that the EAD will provide equal or better performance than the prescriptive standard. The Discharger showed that the geosynthetic materials proposed can tolerate substantially higher strains up to 10 to 18 percent or greater before yielding and can tolerate strains 10 times larger than its soil components. As such, a two-foot thick foundation is not necessary for geosynthetic materials and that a one-foot thick foundation layer is adequate to provide a clean, firm surface for its installation. In addition, the Discharger provided a hydraulic equivalency evaluation for the system using HDPE that showed significantly improved infiltration performance over the prescriptive cover system. The EAD was described and approved in previous WDRs Order No. R5-2003-0118.

Class II Surface Impoundments & LTU

89. When no longer needed, the Class II surface impoundments will be decommissioned and clean-closed in accordance with Title 27 CCR Section 21400. As the landfill progresses westward Cells 8A and 7A will be developed into Class II solid WMUs.
90. The LTU will be clean-closed at the end of its operating life in accordance with Title 27 CCR Section 21420.

LANDFILL STABILITY ANALYSIS

91. The March 2008 design report for Cell 3, Phase 1 and Cell 2, Phase 4 includes a slope stability analysis of the interim waste fill plan. The interim slopes were designed to be consistent with the final grading plan proposed in the JTD. The analysis considers both static and dynamic (seismic) loading conditions and demonstrates that the final grading plan exceeds the regulatory requirements of Title 27 CCR and Subtitle D. Title 27 CCR and Subtitle D requires that the factor of safety (FOS) against slope failure be 1.5 or greater. For seismic stability, a design peak ground acceleration of 0.37g was used for the Maximum Credible Earthquake (MCE). The design earthquake for the seismic analyses was increased from the previous estimate of 0.33g by Anderson (1995) to reflect that the Foothill Fault system is a normal-slip fault, which typically results in higher acceleration than a strike-slip fault at the same distance.

92. The results of the Dischargers slope stability analysis indicate a FOS of 1.5 for static conditions and calculated permanent displacement of 4 inches for the design MCE event. The calculated maximum displacement is less than the maximum allowable displacement of 12 inches commonly accepted for Class II and Class III landfills.

FINANCIAL ASSURANCES

93. The RWD/JTD includes information required by Title 27 CCR Section 21769(b), and includes a lump sum estimate of the cost of carrying out all actions necessary to close each Unit, to prepare detailed design specifications, to develop the final closure and post-closure maintenance plan, and to carry out the first thirty years of post-closure maintenance. The total amount of the closure cost estimate in 2008 dollars is \$22,843,342. The amount of the post-closure maintenance cost estimate in 2008 dollars is \$5,053,222 for the first 30 years. The Discharger has provided the required funding based on these estimates to the California Integrated Waste Management Board (CIWMB) per Title 27 CCR Section 22225. The financial assurance mechanism consists of a Closure and Post-Closure Trust Fund. This Order requires that the Discharger maintain financial assurance with the CIWMB in at least the amount of these cost estimates, plus any annual inflation adjustments required by the CIWMB.
94. The Discharger has also submitted a cost estimate for corrective action of all known or reasonably foreseeable releases as required by Title 27 Section 22221. The amount of the cost estimate approved on 15 August 2002 is \$1,520,000. This Order requires that the Discharger maintain financial assurance with the CIWMB in at least the amount of this cost estimate, plus any annual inflation adjustments required by the CIWMB.
95. Title 27 CCR Sections 21780(c)(3) and (d)(1) [sections promulgated by the CIWMB] require the Discharger to submit the final closure and post-closure maintenance plan, or for the closure of discrete units, the partial final closure and post-closure maintenance plan, at least two years prior to the anticipated date of closure.

CEQA AND OTHER CONSIDERATIONS

96. The Yuba County Community Services Department certified the final environmental impact report for the facility on 23 June 1999. Yuba County Community Services Department filed a Notice of Determination on 22 March 2000 in accordance with the California Environmental Quality Act (Public Resources Code Section 21000 et seq.) and CEQA guidelines (14 CCR Section 15000 et seq.). The Regional Board considered the environmental impact report and incorporated mitigation measures from the environmental impact report into these waste discharge requirements designed to prevent potentially significant impacts to design facilities and to water quality.
97. This order implements:
- a. *The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition*;

- b. The prescriptive standards and performance goals of Chapters 1 through 7, Subdivision 1, Division 2, Title 27, of the California Code of Regulations, effective 18 July 1997, and subsequent revisions;
 - c. The prescriptive standards and performance criteria of RCRA Subtitle D, Part 258; and
 - d. State Water Resources Control Board Resolution No. 93-62, *Policy for Regulation of Discharges of Municipal Solid Waste*, adopted 17 June 1993, and revised on 21 July 2005.
98. Section 13267(b) of California Water Code provides that: "In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposed to discharge within its region, or any citizen or domiciliary, or political agency or entity of this state who had discharged, discharges, or is suspected of having discharged or discharging, or who proposed to discharge waste outside of its region that could affect the quality of the waters of the state within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs of these reports, shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports.
99. The technical reports required by this Order and the attached "Monitoring and Reporting Program No. R5-2009-0020" are necessary to assure compliance with these waste discharge requirements. The Discharger owns and operates the facility that discharges the waste subject to this Order.

PROCEDURAL REQUIREMENTS

100. All local agencies with jurisdiction to regulate land use, solid waste disposal, air pollution, and to protect public health have approved the use of this site for the discharges of waste to land stated herein.
101. The Regional Water Board notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
102. The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.
103. Any person affected by this action of the Regional Water Board may petition the State Water Resources Control Board to review the action in accordance with Sections 2050 through 2068, Title 23, California Code of Regulations. The petition must be received by the State Water Resources Control Board, Office of Chief Counsel, P.O. Box 100, Sacramento, California 95812, within 30 days of the date of issuance of this Order. Copies of the laws and regulations applicable to the filing of a petition are available on

the Internet at <http://www.waterboards.ca.gov/laws/index.html> and will be provided on request.

IT IS HEREBY ORDERED, pursuant to Sections 13263 and 13267 of the California Water Code, that Order No. R5-2006-0068 is rescinded, and that the Norcal Waste Systems Ostrom Road Landfill, Inc., its agents, successors, and assigns, in order to meet the provisions of Division 7 of the California Water Code and the regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS

1. With the exception of asbestos-containing wastes described in Finding No.15 the discharge of 'hazardous waste' is prohibited. For the purposes of this Order, the term 'hazardous waste' is as defined in Title 23, California Code of Regulations, Section 2510 et seq., and 'designated waste' is as defined in Title 27 CCR.
2. The discharge of wastes which have the potential to reduce or impair the integrity of containment structures or which, if commingled with other wastes in the unit, could produce violent reaction, heat or pressure, fire or explosion, toxic by-products, or reaction products which in turn: require a higher level of containment than provided by the unit; or are "restricted hazardous wastes"; or impair the integrity of containment structures is prohibited.
3. The disposal of containerized liquids at this facility is prohibited.
4. The discharge of waste constituents to the unsaturated zone or to groundwater is prohibited.
5. The discharge of wastes outside of a Unit or portions of a Unit specifically designed for their containment is prohibited.
6. The discharge of waste to a closed Unit is prohibited.

Landfills

7. The discharge to landfill units of liquid or semi-solid waste (i.e., waste containing less than 50 percent solids), except dewatered sewage or water treatment sludge as provided in Section 20220(c) of Title 27, is prohibited.
8. Waste that contains liquid in excess of the moisture holding capacity of the waste in the Class II unit, or which contains liquid in excess of the moisture holding capacity as a result of waste management operations, compaction, or settlement, shall not be discharged to a Class II unit.
9. The ponding of any liquid on any landfill module that has received waste is prohibited.

10. The discharge of wastes (including composting wastes) as part of the final cover for any landfill is prohibited. Compost or dried sewage sludge from the LTU may be used as a soil amendment over intermediate or final cover to promote vegetative growth, if applied at agronomic rates and there is no threat to water quality from storm water runoff. Soil that contains waste may be used in the foundation layer.

Surface Impoundments

11. No wastes other than de-watered sewage sludge (sludge that contains at least 20 percent solids (by weight) if primary sludge, or at least 15 percent solids if secondary sludge, or is a mixture of primary and secondary sludges) shall be discharged to the Class II surface impoundments.

Land Treatment Unit

12. No wastes shall be discharged to the LTU from 16 October through 15 April of each year.

Surface Water

13. The discharge of solid or liquid waste or leachate to surface waters, surface water drainage courses, or groundwater is prohibited.
14. The discharge of groundwater, storm water, or wastewater to surface water or any surface water drainage courses is prohibited without an NPDES permit authorizing the discharge.
15. The discharge of waste to ponded water from any source is prohibited.

B. DISCHARGE SPECIFICATIONS

Landfills

1. The discharge shall remain within the designated disposal area at all times.
2. Wastes shall only be discharged into WMUs specifically designed for their containment and/or treatment, as described in this Order.
3. The discharge of waste shall not cause a nuisance condition.
4. The base grade elevations shall not be lower than those shown on Attachment C.
5. Friable asbestos shall only be accepted if double wrapped and manifested.
6. Prior to the use of wastes or materials not already approved as ADC or intermediate cover, the Discharger shall demonstrate that such application does not pose a threat

to water quality and meets the waste classification, composition, and liquid percolation requirements of Title 27 CCR Section 20705.

7. Storm water contacting wastes used as ADC or intermediate cover shall be handled and disposed of as leachate, except as allowed under Prohibition A.10.
8. "Treated wood" wastes may be discharged, but only to an area equipped with a composite liner and leachate collection and removal system, and only if the wastes are handled in accordance with Section 67386.11 of Title 22 as described in Finding No. 17 of this Order. "Treated wood" means wood that has been treated with a chemical preservative for purposes of protecting the wood against attacks from insects, microorganisms, fungi, and other environmental conditions that can lead to decay of the wood and the chemical preservative is registered pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Sec. 136 and following). This may include but is not limited to waste wood that has been treated with chromated copper arsenate (CCA), pentachlorophenol, creosote, acid copper chromate (ACC), ammoniacal copper arsenate (ACA), ammoniacal copper zinc arsenate (ACZA), or chromated zinc chloride (CZC).
9. Treated wood must be managed to ensure consistency with Section 67386.11 of Title 22. Treated wood waste shall not be discharged to landfill cells that are leaking. Treated wood waste shall not be discharged to any landfill cell after confirmation of a release from that cell to either the unsaturated zone or groundwater until corrective action results in cessation of the release.
10. Discharge Specifications B.8 and B.9, above, apply only to treated wood waste that is a hazardous waste solely due to the presence of a preservative in the wood, and is not subject to regulation as a hazardous waste under the federal act.
11. Leachate or landfill gas condensate from a lined landfill module shall be discharged either to a publicly owned treatment works under permit, or discharged as described in Finding No. 84 of this Order. Leachate and condensate returned to a landfill unit shall be managed such that it does not cause instability of the waste, does not cause leachate seeps, does not generate additional landfill gas that is not extracted from the landfill by an active landfill gas extraction system, does not cause contaminants to enter surface water runoff, and does not cause leachate volumes to exceed the maximum capacity of the LCRS or violation of Construction Specification No. D.4 of this Order.
12. Automated pumping systems shall be installed in all leachate sumps and operated to prevent buildup of head on the liner. The depth of leachate in any LCRS sump shall be kept at or below the minimum needed to ensure safe pump operation, but shall be no greater than the depth of the LCRS sump plus three inches. Leachate levels in S-1A shall be maintained below two feet of vertical distance. If leachate depths exceed these levels or if liquid is detected in the underlying leak detection layer then the Discharger shall immediately cease the discharge of high-liquid content sludges and other high-moisture wastes to the landfill module and shall notify the Regional Water

Board in writing within seven days. Notification shall include a time table for remedial or corrective action necessary to reduce leachate production.

13. The Discharger shall implement a waste acceptance program including a periodic load checking program to ensure that 'hazardous wastes' are not discharged to any Class II Landfill at the facility. The program shall also ensure that wastes exceeding moisture limitations are not discharged to Landfill units.

Surface Impoundments

14. The proposed sludge storage impoundment(s) in Cell 8A shall be classified as a Class II surface impoundment(s) and be operated as a Class II surface impoundment(s) for temporary storage of de-watered sewage sludge until clean-closed.
15. The proposed sludge storage impoundment(s) in Cell 8A shall be operated to provide a minimum separation of two and one half feet between waste or leachate and the highest anticipated elevation of underlying groundwater.
16. Contact storm water collected in the proposed surface impoundment(s) LCRS shall be handled and disposed of as leachate.

Land Treatment Unit

1. The sludge drying area shall be operated and maintained as a Class II LTU until clean-closed.
2. The LTU shall be operated to provide a minimum separation of five feet between the base of the LTU and the highest anticipated elevation of underlying groundwater.
3. Wastes discharged to the LTU shall be limited to de-watered sewage sludge, as described in the JTD.
4. The LTU shall only be operated from **16 April through 15 October**. All sludge shall be removed by **15 October** each year, as specified in Prohibition A.12.
5. The LTU shall be operated to maximize the degradation, transformation, and immobilization of waste constituents in the treatment zone, in accordance with Title 27 CCR Section 20377.
6. The LTU shall be operated and maintained so as not to reduce the zone of attenuation and to maintain a minimum of five feet of separation from highest anticipated groundwater. The LTU pad thickness may be included as part of the zone of attenuation.
7. The quantity of wastes discharged to the LTU shall not exceed its drying capacity.

8. Stockpiles of manufactured soil in the LTU area or adjacent to modules to be constructed shall be winterized in accordance with the winterization plan, as described in Section E.7 of Monitoring and Reporting Program No. R5-2009-0020.
9. Storm water contacting wastes in the LTU area shall be handled and disposed of as leachate.

C. FACILITY SPECIFICATIONS

1. The Discharger shall, in a timely manner, remove and relocate any wastes discharged at this facility in violation of this Order. If the Discharger is unable to remove and relocate the waste, the Discharger shall submit a report to the Regional Water Board explaining how the discharge occurred, why the waste cannot be removed, and any updates to the waste acceptance program necessary to prevent re-occurrence.
2. Waste filling at landfill modules shall be conducted in accordance with a fill plan demonstrating that all temporary refuse fill slopes will be stable under both static and dynamic conditions for the design event for the unit.
3. All temporary stockpiles of ADC and other wastes shall be stable under both static and dynamic conditions for the design event for the unit.
4. The Discharger shall immediately notify the Regional Water Board of any flooding, unpermitted discharge of waste off-site, equipment failure, slope failure, or other change in site conditions which could impair the integrity of waste or leachate containment facilities or precipitation and drainage control structures.
5. Water used for facility maintenance shall be limited to the minimum amount necessary for dust control, construction and to start the vegetative cover.
6. Landfill leachate used for dust control shall be limited to lined areas of the landfill and shall only be used during the dry season (15 April through 15 October).
7. The Discharger shall maintain in good working order any facility, control system, or monitoring device installed to achieve compliance with the waste discharge requirements.
8. All LCRS shall convey all leachate that reaches the liner to a sump or other appropriately lined collection area.
9. Methane and other landfill gases shall be adequately vented, removed from the Unit, or otherwise controlled to prevent the danger of adverse health effects, nuisance conditions, degradation, or the impairment of the beneficial uses of surface water or groundwater due to migration through the unsaturated zone.
10. Surface drainage within the waste management facility shall either be contained on-site or be discharged in accordance with applicable storm water regulations.

11. Precipitation and drainage control systems shall be designed and constructed to accommodate the anticipated volume of precipitation and peak flows from surface runoff under 1,000-year, 24-hour precipitation conditions.
12. MSW landfill units shall not restrict the flow of the 100-year flood, reduce the temporary water storage capacity of the floodplain, or result in washout of solid waste so as to pose a hazard to human health and the environment (40 CFR 258.11).
13. The Discharger shall prevent floodwaters from a 100-year flood from contacting wastes in a disposal module. As the site is developed, the Discharger shall maintain berms at a minimum two-feet higher than the January 1997 high water elevations to prevent flood waters from a 100-year flood from entering the site.
14. The Discharger shall maintain a *Storm Water Pollution Prevention Plan and Monitoring Program and Reporting Requirements* in accordance with State Water Resources Control Board's most recent WDRs for Discharges of Storm Water associated with Industrial Activities (currently Order No. 97-03-DWG, NPDES No. CAS000001), or retain all storm water on-site.
15. Landfill gas control measures shall be implemented for a Class II landfill module upon the confirmed presence of gas-phase concentrations of volatile organic compounds (VOCs) at 1.0 parts per million by volume (ppmv) or greater in the leak detection layer (for laboratory analysis by EPA Method TO-15). The purpose of the confirmation sampling shall be to confirm the presence of VOCs as opposed to a particular VOC analyte. The gas control measures shall be sufficient to prevent the gas-phase migration of VOCs from the Class II modules.
16. Prior to the discharge of waste to the landfill, all wells within 500 feet of the unit shall have sanitary seals, which meet the requirements of the Yuba County Environmental Health Department or shall be properly abandoned. A record of the sealing and/or abandonment of such wells shall be sent to the Regional Board and to the State Department of Water Resources.
17. Intermediate cover shall be applied to areas of the landfill where filling is not anticipated within 180 days. Intermediate cover shall consist of one foot of compacted soil with a permeability less than 1×10^{-5} cm/sec or an approved engineered alternative. The active disposal area shall be confined to the smallest area practical based on the anticipated quantity of waste discharge and other waste management facility operations.
18. Annually, prior to the anticipated rainy season, any necessary erosion control measures shall be implemented, and any necessary construction, maintenance, or repairs of precipitation and drainage control facilities shall be completed to prevent erosion or flooding and to prevent surface drainage from contacting or percolating through wastes.

19. All Class II Landfills shall be designed to withstand the maximum credible earthquake without damage to the foundation, or to the structures, which control leachate, surface drainage, erosion, or gas.

D. CONSTRUCTION SPECIFICATIONS

1. The Discharger shall submit for review and approval at least 90 days **prior to** construction, design plans and specifications for new Units and expansions of existing Units, that include the following:
 - a. A Construction Quality Assurance Plan meeting the requirements of Title 27 CCR Section 20324;
 - b. A geotechnical evaluation of the area soils, evaluating their use as the base layer;
 - c. An unsaturated zone monitoring system, which is demonstrated to remain effective throughout the active life, closure, and post-closure maintenance periods of the Unit, which shall be installed beneath the composite liner system in accordance with Title 27 CCR Section 20415(d); and
 - d. Revised Sample Collection and Analysis Plan incorporating changes to the groundwater detection monitoring system to accommodate the new unit in accordance with Title 27 CCR Section 20420.
2. A minimum separation of 5 feet shall be maintained between wastes or leachate in existing Cells 1, 2A and 2B and the highest anticipated elevation of underlying groundwater including the capillary fringe. A continuous 60-mil HDPE geomembrane shall be installed beneath the entire composite base liner system in all future cells to create a barrier to groundwater or capillary rise and to maintain a minimum separation of 2.5 vertical feet between wastes or leachate and underling groundwater.
3. All Class II units and modules shall be designed and constructed for a maximum credible earthquake per Title 27 CCR Section 20370.
4. LCRSs shall be designed, constructed, and maintained to collect at least twice the anticipated daily volume of leachate generated by the module and to prevent the buildup of hydraulic head on the underlying liner at any time. The depth of fluid in any LCRS sump shall be kept at or below the minimum needed to ensure safe pump operation, but shall be no greater than the depth of the LCRS sump plus 3 inches.
5. If monitoring reveals that the depth of fluid on any portion of the LCRS exceeds the values listed in Construction Specification D.4, the Discharger shall immediately notify the Regional Water Board and provide a written notification within seven days. The notification shall include a timetable for remedial or corrective action necessary to achieve compliance with the leachate depth limitation.

6. Each LCRS shall be designed and operated to be free draining and at no time shall the LCRS be allowed to become a pressurized conduit.
7. LCRS shall be designed and operated to function without clogging through the scheduled closure of the Unit and during the post closure maintenance period. The systems shall be tested at least annually to demonstrate proper operation (i.e., no clogging, collapse, or reduced drainage capacity). The results of the tests shall be compared with earlier tests made under comparable conditions and reported to the Regional Water Board in the Annual Report.
8. Each unit's LCRS sumps shall be equipped with automated pumps. The Discharger shall maintain and implement an O&M plan to ensure that the LCRS and pumps are operating properly. The O&M plan shall be kept in the facility office. The leachate volume from each unit shall be recorded monthly based on accumulated volumes in dedicated tanks.
9. Both the bottom and side slope containment systems of all new landfill expansion modules shall be constructed in accordance with one of the following composite liner designs:
 - a. The prescriptive standard design which consists of a lower compacted soil layer that is a minimum of two feet thick with a hydraulic conductivity of 1×10^{-7} cm/sec or less and has a minimum relative compaction of 90%. Immediately above the compacted soil layer, and in direct and uniform contact with the soil layer, shall be a synthetic flexible membrane component that shall be at least 40-mil thick (or at least 60-mil thick if composed of HDPE), which is immediately overlain with an LCRS. A soil operations layer shall be placed above the LCRS; or
 - b. In accordance with the engineered alternative base liner and side slope designs specified in the *Liner Performance Demonstration*, see Finding No. 47.
10. The Discharger may propose changes to the liner system design prior to construction, provided that approved components are not eliminated, the engineering properties of the components are not substantially reduced, and the proposed liner system results in the protection of water quality equal to or greater than the design prescribed by Title 27 CCR and this Order. The proposed changes may be made following approval by the Executive Officer. Substantive changes to the design require reevaluation as an engineered alternative and approval by the Regional Water Board.
11. Construction shall proceed only after all applicable construction quality assurance plans have been approved.
12. A third party independent of both the Discharger and the construction contractor shall perform all of the construction quality assurance monitoring and testing during the construction of a liner system.

13. Following the completion of construction of a Unit or portion of a Unit, and prior to discharge onto the newly constructed liner system, the final documentation required in Title 27 CCR Section 20324(d)(1)(C) shall be submitted for review and approval. The report shall be certified by a registered civil engineer or a certified engineering geologist. It shall contain sufficient information and test results to verify that construction was in accordance with the design plans and specifications, and with the prescriptive standards and performance goals of Title 27.

E. DETECTION MONITORING SPECIFICATIONS

1. **Within 60 days of the date of this Order**, the Discharger shall submit for review and approval a groundwater detection-monitoring program demonstrating compliance with Title 27 for any Unit expansion.
2. The Discharger shall comply with the detection monitoring program provisions of Title 27 for groundwater, surface water, and the unsaturated zone, and in accordance with Monitoring and Reporting Program No. R5-2009-0020. A detection-monitoring program for a new Unit shall be installed, operational, and one year of monitoring data collected prior to the discharge of wastes [Title 27 CCR Section 20415(e)(6)].
3. The Discharger shall provide Regional Board staff a minimum of **one week** notification prior to commencing any field activities related to the installation, repair, or abandonment of monitoring devices, and a minimum 48 hour notification prior to the collection of samples associated with a detection monitoring program, evaluation monitoring program, or corrective action program.
4. **By 9 April 2009**, the Discharger shall submit for review and approval an updated Water Quality Protection Standard Report consisting of all constituents of concern, the concentration limit for each constituent of concern, the point of compliance, and all water quality monitoring points as described in C1 of the Monitoring and Reporting Program No. R5-2009-0020.
5. The Discharger shall comply with the Water Quality Protection Standard as specified in this Order, Monitoring and Reporting Program No. R5-2009-0020, and the Standard Provisions and Reporting Requirements, dated April 2000.
6. The Water Quality Protection Standard for organic compounds which are not naturally occurring and not detected in background groundwater samples shall be taken as the detection limit of the analytical method used (i.e., US-EPA methods 8260 and 8270). The repeated detection of one or more non-naturally occurring organic compounds in samples above the Water Quality Protection Standard from detection monitoring wells is evidence of a release from the Unit.
7. The concentrations of the constituents of concern in waters passing the Point of Compliance shall not exceed the concentration limits established pursuant to Monitoring and Reporting Program No. R5-2009-0020.

8. For each monitoring event, the Discharger shall determine whether the landfill is in compliance with the Water Quality Protection Standard using procedures specified in Monitoring and Reporting Program No. R5-2009-0020 and Title 27 CCR Section 20415(e).
9. **Within 60 days of the date of this Order**, the Discharger shall submit for review and approval an updated Sample Collection and Analysis Plan. The Sample Collection and Analysis Plan shall at a minimum include:
 - a. Sample collection procedures describing purging techniques, sampling equipment, and decontamination of sampling equipment;
 - b. Sample preservation information and shipment procedures;
 - c. Sample analytical methods and procedures;
 - d. Sample quality assurance/quality control (QA/QC) procedures; and
 - e. Chain of Custody control.
10. For any given monitored medium, the samples taken from all monitoring points and background monitoring points to satisfy the data analysis requirements for a given reporting period shall all be taken **within a span not to exceed 30 days**, unless a longer time period is approved, and shall be taken in a manner that ensures sample independence to the greatest extent feasible. Specific methods of collection and analysis must be identified. Sample collection, storage, and analysis shall be performed according to the most recent version of USEPA Methods, such as the latest editions, as applicable, of: (1) Methods for the Analysis of Organics in Water and Wastewater (USEPA 600 Series), (2) Test Methods for Evaluating Solid Waste (SW-846, latest edition), and (3) Methods for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020), and in accordance with the approved Sample Collection and Analysis Plan.
11. If methods other than USEPA-approved methods or Standard Methods are used, the exact methodology shall be submitted for review and approval prior to use.
12. The **methods of analysis and the detection limits** used must be appropriate for the expected concentrations. For the monitoring of any constituent or parameter that is found in concentrations which produce more than 90% non-numerical determinations (i.e., "trace" or "ND") in data from background monitoring points for that medium, the analytical method having the lowest method detection limit (MDL) shall be selected from among those methods which would provide valid results in light of any matrix effects or interferences.
13. **"Trace" results** - results falling between the MDL and the practical quantitation limit (PQL) - shall be reported as such, and shall be accompanied by both the estimated MDL and PQL values for that analytical run.

14. **MDLs and PQLs** shall be derived by the laboratory for each analytical procedure, according to State of California laboratory accreditation procedures. These MDLs and PQLs shall reflect the detection and quantitation capabilities of the specific analytical procedure and equipment used by the lab, rather than simply being quoted from USEPA analytical method manuals. In relatively interference-free water, laboratory-derived MDLs and PQLs are expected to closely agree with published USEPA MDLs and PQLs.
15. If the laboratory suspects that, due to a change in matrix or other effects, the true detection limit or quantitation limit for a particular analytical run differs significantly from the laboratory-derived MDL/PQL values, the results shall be flagged accordingly, along with estimates of the detection limit and quantitation limit actually achieved. The **MDL shall always be calculated such that it represents the lowest achievable concentration associated with a 99% reliability of a nonzero result.** The PQL shall always be calculated such that it represents the lowest constituent concentration at which a numerical value can be assigned with reasonable certainty that it represents the constituent's actual concentration in the sample. Normally, PQLs should be set equal to the concentration of the lowest standard used to calibrate the analytical procedure.
16. **All QA/QC data** shall be reported, along with the sample results to which they apply, including the method, equipment, analytical detection and quantitation limits, the percent recovery, an explanation for any recovery that falls outside the QC limits, the results of equipment and method blanks, the results of spiked and surrogate samples, the frequency of quality control analysis, and the name and qualifications of the person(s) performing the analyses. Sample results shall be reported unadjusted for blank results or spike recoveries. In cases where contaminants are detected in QA/QC samples (i.e., field, trip, or lab blanks), the accompanying sample results shall be appropriately flagged.
17. Unknown chromatographic peaks shall be reported, flagged, and tracked for potential comparison to subsequent unknown peaks that may be observed in future sampling events. Identification of unknown chromatographic peaks that recur in subsequent sampling events may be required.
18. The statistical method shall account for data below the PQL with one or more statistical procedures that are protective of human health and the environment. Any PQL validated pursuant to Title 27 CCR Section 20415(e)(7) that is used in the statistical method shall be **the lowest concentration (or value) that can be reliably achieved** within limits of precision and accuracy specified in the WDRs for routine laboratory operating conditions that are available to the facility. The Discharger's technical report, pursuant to Title 27 CCR Section 20415(e)(7), shall consider the PQLs listed in Appendix IX to Chapter 14 of Division 4.5 of Title 22, CCR, for guidance when specifying limits of precision and accuracy. For any given constituent monitored at a background or downgradient monitoring point, an indication that falls between the MDL and the PQL for that constituent (hereinafter called a "trace" detection) shall be

identified and used in appropriate statistical or nonstatistical tests. Nevertheless, for a statistical method that is compatible with the proportion of censored data (trace and ND indications) in the data set, the Discharger can use the laboratory's concentration estimates in the trace range (if available) for statistical analysis, in order to increase the statistical power by decreasing the number of "ties."

19. Background for water samples or soil-pore gas samples shall be represented by the data from all samples taken from applicable background monitoring points during that reporting period (at least one sample from each background monitoring point). The Discharger may propose an alternate statistical method [to the methods listed under Title 27 CCR Section 20415(e)(8)(A-D)] in accordance with Title 27 CCR Section 20415(e)(8)(E) of Title 27, for review and approval.
20. The Discharger may propose an alternate statistical method [to the methods listed under Title 27 CCR Section 20415(e)(8)(A-D)] in accordance with Title 27 CCR Section 20415(e)(8)(E), for review and approval. Upon receiving written approval, alternate statistical procedures may be used for determining the significance of analytical results for common laboratory contaminants (i.e., methylene chloride, acetone, diethylhexyl phthalate, and di-n-octyl phthalate). Nevertheless, analytical results involving detection of these analytes in any background or downgradient sample shall be reported and flagged for easy reference by Regional Water Board staff.
21. The Discharger shall use the following non-statistical method for all analytes that are detected in less than 10% of the background samples. The non-statistical method shall be implemented as follows:
 - a. From the constituent of concern or monitoring parameter list, identify each analyte in the current sample that exceeds either its respective MDL or PQL. The Discharger shall conclude that the exceedance provides a preliminary indication [or, for a retest, provides measurably significant evidence] of a release or a change in the nature or extent of the release, at that monitoring point, if **either**:
 - 1) The data contains two or more analytes that are detected in less than 10% of background samples that equal or exceed their respective MDLs; or
 - 2) The data contains one or more analyte that equals or exceeds its PQL.
 - b. **Discrete Retest** [Title 27 CCR Section 20415(e)(8)(E)]:
 - 1) In the event that the Discharger concludes (pursuant to paragraph 20.a., above) that there is a preliminary indication of a release, then the Discharger shall immediately notify Regional Water Board staff by phone or e-mail and, within 30 days of such indication, shall collect **two** new (retest) samples from the monitoring point where the release is preliminarily indicated.

- 2) For any given retest sample, the Discharger shall include, in the retest analysis, only the laboratory analytical results for those analytes detected in the original sample. As soon as the retest data are available, the Discharger shall apply the same test [under 20.a.], to separately analyze each of the two suites of retest data at the monitoring point where the release is preliminarily indicated.
- 3) If either (or both) of the retest samples trips either (or both) of the triggers under 20.a., then the Discharger shall conclude that there is measurably significant evidence of a release at that monitoring point for the analyte(s) indicated in the validating retest sample(s) and shall:
 - a) **Immediately** notify the Regional Water Board about the constituent verified to be present at the monitoring point, and follow up with written notification submitted by certified mail **within seven days** of validation; and
 - b) Comply with 21, below.
- 4) Any analyte that triggers a discrete retest per this method shall be added to the monitoring parameter list such that it is monitored during each regular monitoring event.

22. If the Discharger determines that there is measurably significant evidence of a release from the Unit at any monitoring point, the Discharger shall **immediately** implement the requirements of **XI. Response To A Release, C. Release Has Been Verified**, contained in the Standard Provisions and Reporting Requirements.

F. CLOSURE SPECIFICATIONS

1. At closure, each WMU shall receive a final cover in accordance with the prescriptive standards of Subtitle D and Title 27 CCR or engineered alternative design as described in Finding No.88.
2. Vegetation shall be planted and maintained over each closed landfill module. Vegetation shall be selected to require a minimum of irrigation and maintenance and shall have a rooting depth not in excess of the vegetative layer thickness.
3. During closure, sufficient erosion and sedimentation controls shall be installed to prevent erosion of the cover material before vegetation and be established and to prevent excessive sediment in storm water runoff.
4. The WMU slopes shall not exceed a horizontal-to-vertical ratio of 3:1 (not including benching) to ensure slope stability. Other areas with slopes greater than ten percent, surface drainage courses, and areas subject to erosion by wind or water shall be designed and constructed to prevent such erosion.

5. The closed landfill shall have 20-foot wide benches at least every 50 vertical feet. The maximum height for the closed facility, including final cover, is 365 feet MSL (see Finding No. 86).
6. The WMU final slopes shall not be less than five percent grade to accommodate post closure settlement and to prevent ponding and infiltration.
7. All final cover slopes shall be designed and constructed to withstand an MCE event as required under Title 27 CCR Section 21750(f)(5).
8. The waiting period for installation of the final cover shall not exceed five years after the date a portion of the landfill reaches final elevation, as specified under "Prompt Incremental Closure," Title 27 CCR Section 21090(b)(1)(D).
9. Upon termination of the dewatered sewage sludge operations, the Class II surface impoundment(s) shall be clean closed. After clean closure, the surface impoundments may be re-built as part of a Class II landfill module (Cell 8A) and may be used for disposal operations.

G. PROVISIONS

1. The Discharger shall maintain a copy of this Order at the facility and make it available at all times to facility operating personnel, who shall be familiar with its contents, and to regulatory agency personnel.
2. The Discharger shall comply with all applicable provisions of Title 27 CCR and 40 Code of Federal Regulations Part 258 (Subtitle D) that are not specifically referred to in this Order.
3. The Discharger shall comply with Monitoring and Reporting Program No. R5-2009-0020, which is incorporated into and made part of this Order.
4. The Discharger shall comply with the applicable portions of the Standard Provisions and Reporting Requirements for Waste Discharge Requirements for Nonhazardous Solid Waste Discharges Regulated by Title 27 CCR and/or Subtitle D (27 CCR Section 20005 et seq. and 40 CFR 258 et seq.), dated April 2000, which are hereby incorporated into this Order.
5. In the event the Discharger does not comply or will be unable to comply with any prohibition or limitation of this Order for any reason, the Discharger shall notify the appropriate Regional Water Board office by telephone **as soon as** it or its agents have knowledge of such noncompliance or potential for noncompliance, and shall confirm this notification in writing **within two weeks**. The written notification shall state the nature, time, and cause of noncompliance, and shall describe the measures being taken to prevent recurrences and shall include a timetable for corrective actions.
6. All reports and transmittal letters shall be signed by persons identified below:

- a. For a corporation: by a principal executive officer of at least the level of senior vice-president.
 - b. For a partnership or sole proprietorship: by a general partner or the proprietor.
 - c. For a municipality, state, federal or other public agency: by either a principal executive officer or ranking elected or appointed official.
 - d. A duly authorized representative of a person designated in a, b or c above if;
 - 1) The authorization is made in writing by a person described in a, b, or c of this provision;
 - 2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a Unit, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
 - 3) The written authorization is submitted to the Regional Water Board.
 - e. Any person signing a document under this Section shall make the following certification:

“I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.”
7. The Discharger shall take all reasonable steps to minimize any adverse impact to the waters of the State resulting from noncompliance with this Order. Such steps shall include accelerated or additional monitoring as necessary to determine the nature, extent, and impact of the noncompliance.
 8. The Discharger shall have the continuing responsibility to assure protection of waters of the state from discharged wastes and from gases and leachate generated by discharged waste during the active life, closure, and post-closure maintenance period of the Unit(s) as long as the wastes pose a threat to water quality.
 9. The fact that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with this Order shall not be regarded as a defense for the Discharger's violations of the Order.
 10. To assume ownership or operation under this Order, the succeeding owner or operator must apply in writing to the Regional Water Board requesting transfer of the Order within 14 days of assuming ownership or operation of this facility. The request must

contain the requesting entity's full legal name, the State of incorporation if a corporation, the name and address and telephone number of the persons responsible for contact with the Regional Water Board, and a statement. The statement shall comply with the signatory requirements contained in Provision G.6. and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code. Transfer of this Order shall be approved or disapproved by the Regional Water Board.

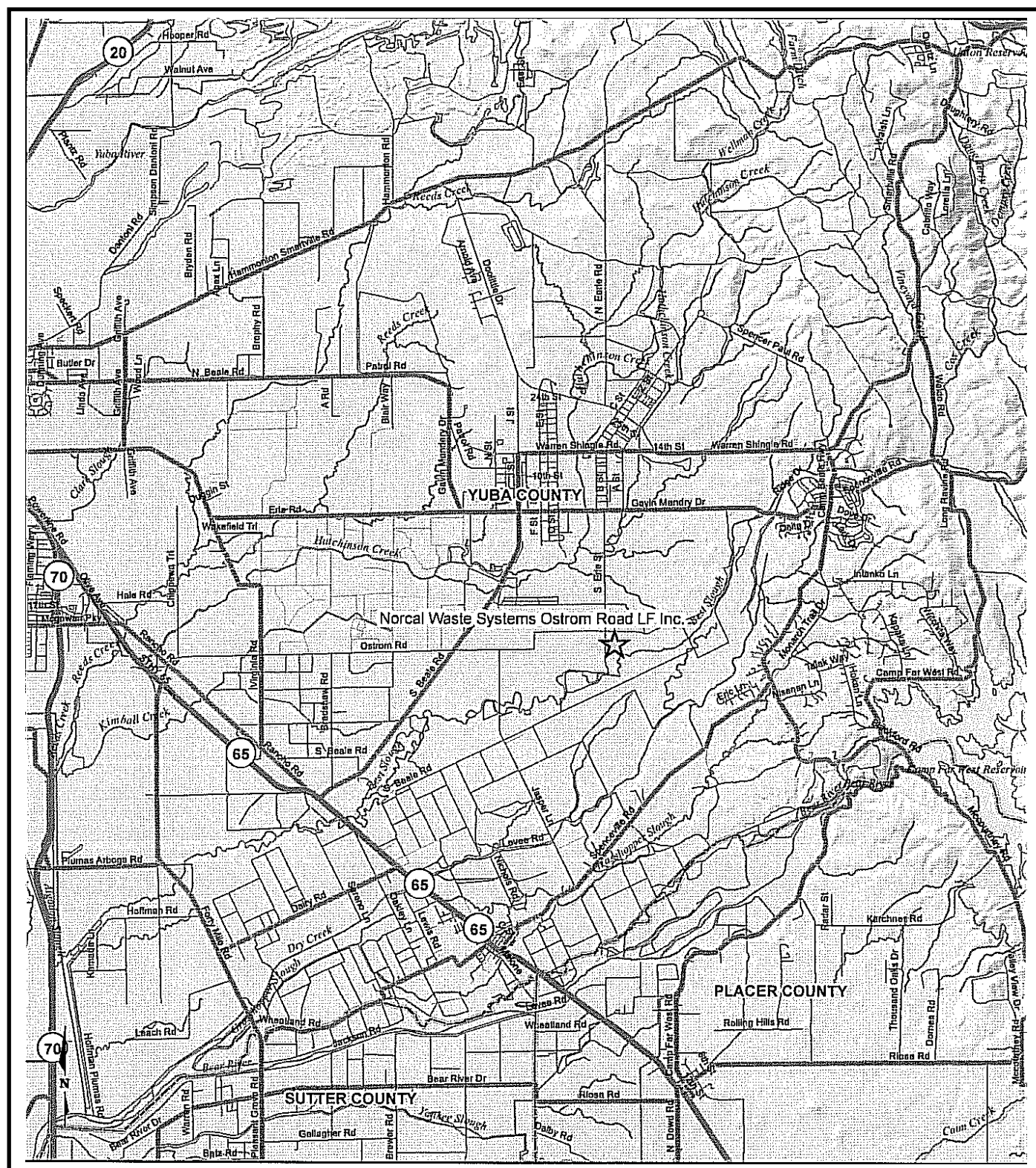
11. The Discharger shall maintain assurances of financial responsibility for closure of the landfill in the amount of the approved cost estimate described in Finding No. 93 of this Order, plus any annual inflation adjustments required by the California Integrated Waste Management Board (CIWMB). If the CIWMB determines that either the amount of coverage or the mechanism is inadequate, the Discharger shall submit a demonstration of acceptable financial assurance to the CIWMB within no more than 90 days of notification.
12. The Discharger shall maintain assurances of financial responsibility for carrying out the first 30 years of post-closure maintenance at the landfill in the amount of the approved cost estimate described in Finding No. 93 of this Order, plus any annual inflation adjustments required by the CIWMB. If the CIWMB determines that either the amount of coverage or the mechanism is inadequate, the Discharger shall submit a demonstration of acceptable financial assurance to the CIWMB within no more than 90 days of notification.
13. The Discharger shall maintain assurances of financial responsibility for initiating and completing corrective action for all known or reasonably foreseeable releases from the landfill with the CIWMB in the amount of the approved cost estimate described in Finding No. 94 of this Order, plus any annual inflation adjustments required by the CIWMB. If the CIWMB determines that either the amount of coverage or the mechanism is inadequate, the Discharger shall submit a demonstration of acceptable financial assurance to the CIWMB within no more than 90 days of notification.
14. The Discharger shall submit a post-earthquake inspection plan for review and approval **within 90 days** following adoption of this Order. The plan shall include inspecting liners and covers; LCRS riser pipes, sump pump operation, and storage tanks; landfill gas flares; drainage control facilities; and detection monitoring facilities for damage following an earthquake of Magnitude (M) 5.0 or greater within 25 miles of the facility or a M6.0 or greater earthquake within 50 miles of the facility.
15. The Discharger shall conduct an earthquake inspection in a timely manner following earthquakes of the magnitude as specified in Provision 14. A report of the inspection shall be submitted within 30 days after the inspection assessing any damage and shall contain proposals to repair or replace any damaged structures or facilities.
16. The Discharger shall complete the tasks contained in these waste discharge requirements in accordance with the following time schedule:

<u>Task</u>	<u>Compliance Date</u>
A. Construction Plans	
Submit construction and design plans for review and approval per Construction Specification D.1.	90 Days prior to construction
B. Construction Report	
Submit a construction report upon completion demonstrating construction was in accordance with approved construction plans for review and approval per Construction Specification D.11.	Prior to discharge
C. Groundwater Detection Monitoring Program	Within 60 days of the date of this order
D. Water Quality Protection Standard Report	Within 60 days of the date of this order
E. Sample Collection and Analysis Plan	Within 60 days of the date of this order

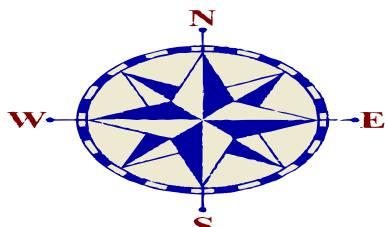
I, PAMELA C. CREEDON, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 5 February 2009.

JSH: 02/05/09

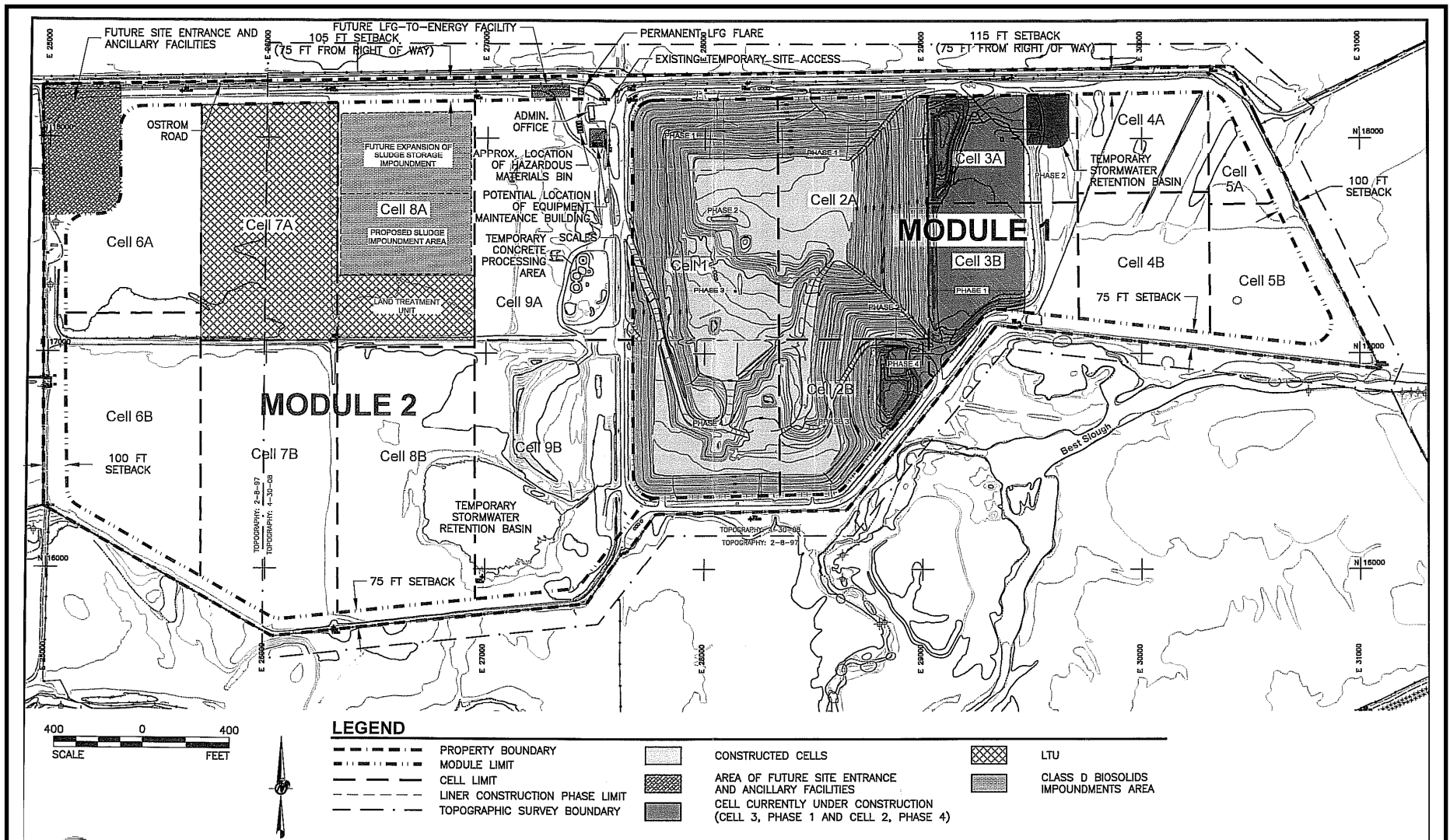
PAMELA C. CREEDON, Executive Officer



Drawing Reference:
Golder Associates, Site
Vicinity Map, Figure 2-1

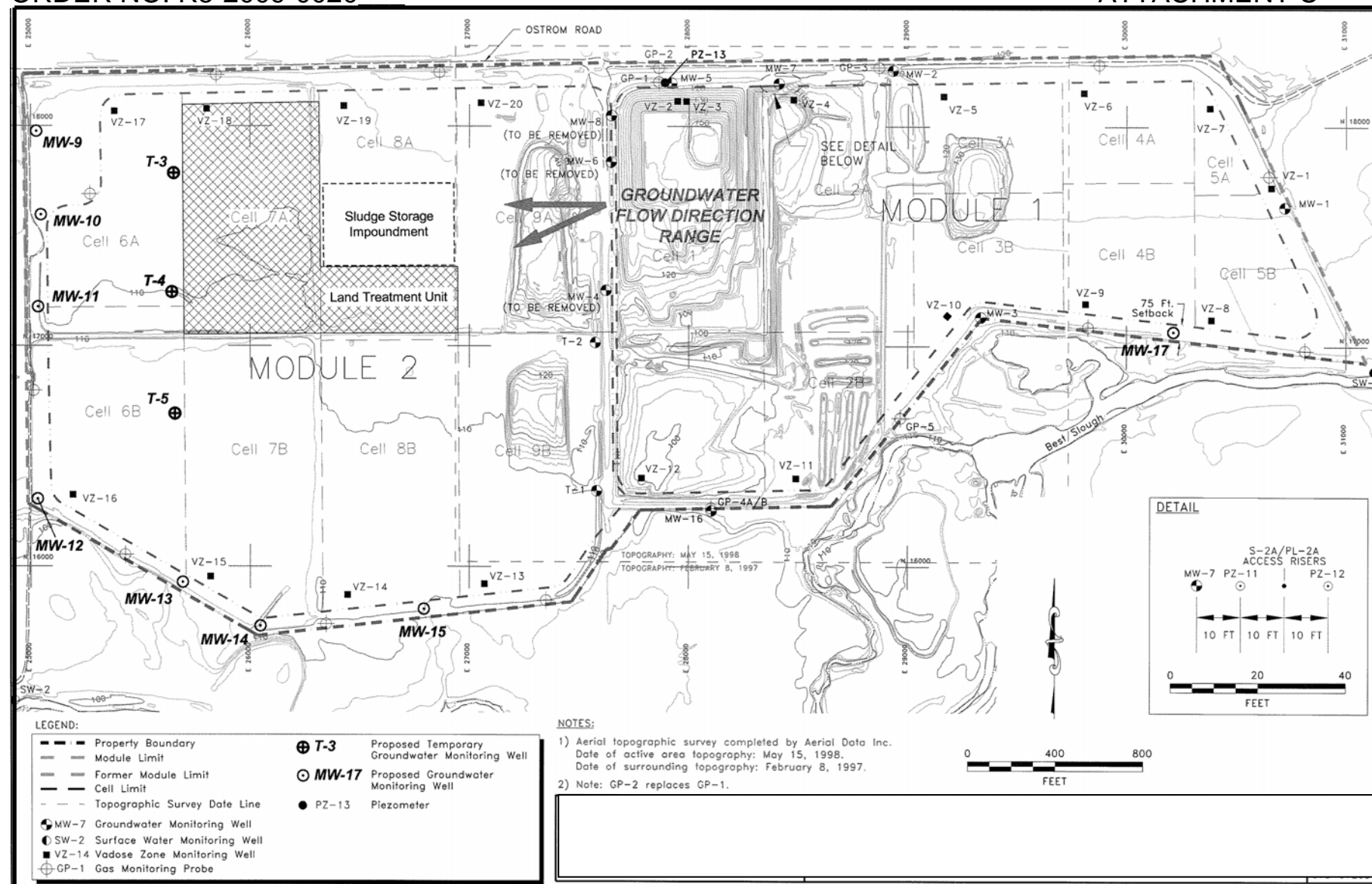


SITE LOCATION MAP OSTROM ROAD LANDFILL YUBA COUNTY



Drawing Reference
Golder Associates, 2008
Site Plan, Figure 2-3

FACILITY SITE PLAN
OSTROM ROAD LANDFILL
YUBA COUNTY



Drawing Reference
Golder Associates, 2008
Monitoring Plan, Figure 6-1

FACILITY MONITORING PLAN OSTROM ROAD LANDFILL YUBA COUNTY

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO R5- 2009-0020

MONITORING AND REPORTING PROGRAM
FOR
NORCAL WASTE SYSTEMS OSTROM ROAD LANDFILL, INCORPORATED
OSTROM ROAD LANDFILL
CLASS II LANDFILL, CLASS II SURFACE IMPOUNDMENT,
AND CLASS II LAND TREATMENT UNIT
CONSTRUCTION, OPERATION, POST-CLOSURE MAINTENANCE,
AND CORRECTIVE ACTION
YUBA COUNTY

The Discharger shall comply with this Monitoring and Reporting Program, with Title 27, California Code of Regulations, Section 20005, et seq. (hereafter Title 27), and with the *Standard Provisions and Reporting Requirements for Waste Discharge Requirements for Nonhazardous Solid Waste Discharges Regulated by Title 27 and/or Subtitle D (27 CCR §20005 et seq. and 40 CFR 258)*, dated April 2000, as ordered by Waste Discharge Requirements Order No. R5-2009-0020.

A. REQUIRED MONITORING REPORTS

<u>Report</u>	<u>Due</u>
1. Groundwater Monitoring (Section D.1)	See Tables I-A, 1-C
2. Unsaturated Zone Monitoring (Section D.2)	See Table II
3. Landfill Gas Monitoring (Section D.3)	See Table III
4. Leachate Monitoring/Seeps (Section D.4)	See Table IV
5. Leak Detection Monitoring(Section D.5)	See Table V
6. Surface Water Monitoring (Section D.6)	See Table VI
7. Storm Water Monitoring (Section D.7)	See Table VI
8. Semi-solid Waste Monitoring (Section D.8)	See Table VII
9. Facility Monitoring (Section D.9)	As necessary
10. Annual Monitoring Summary Report (Section E.5)	Annually
11. Response to a Release	As necessary
12. Water Quality Protection Standard Report	2009

B. REPORTING

The Discharger shall submit semiannual monitoring reports with the data and information required in this Monitoring and Reporting Program and as required in Order No. R5-2009-0020 and the Standard Provisions and Reporting Requirements, April 2000. Reports which do not comply with the required format will be **REJECTED** and the Discharger shall be deemed to be in noncompliance with the waste discharge requirements. In reporting the monitoring data required by this program, the Discharger shall arrange the data in tabular form so that the date, the constituents, the concentrations, and the units are readily discernible. The data shall be summarized in such a manner so as to illustrate clearly the compliance with waste discharge requirements or the lack thereof. Data shall also be submitted in a digital format acceptable to the Executive Officer.

Each monitoring report shall include a compliance evaluation summary as specified in Section E.3, below.

Field and laboratory tests shall be reported in each monitoring report. Monthly, quarterly, semiannual, and annual monitoring reports shall be submitted to the Regional Water Board in accordance with the following schedule for the calendar period in which samples were taken or observations made.

<u>Sampling Frequency</u>	<u>Reporting Frequency</u>	<u>Reporting Periods End</u>	<u>Report Date Due</u>
Monthly	Semiannually	Last Day of Month	by Semiannual Schedule
Quarterly	Semiannually	31 March	by Semiannual Schedule
		30 June	by Semiannual Schedule
		30 September	by Semiannual Schedule
		31 December	by Semiannual Schedule
Semiannually	Semiannually	30 June	31 July
		31 December	31 January
Annually	Annually	31 December	31 January
5-Year*	Every 5 years	31 December	31 January

* Last 5-year sampling was completed in 2006

The Discharger shall submit an **Annual Monitoring Summary Report** to the Regional Water Board covering the previous monitoring year. The annual report shall contain the information specified in E. Reporting Requirements, below, and a discussion of compliance with the waste discharge requirements and the Water Quality Protection Standard. The results of **all monitoring** conducted at the site shall reported to the Regional Water Board in accordance with the reporting schedule above for the calendar period in which samples were taken or observations made.

C. WATER QUALITY PROTECTION STANDARD AND COMPLIANCE PERIOD

1. Water Quality Protection Standard Report

For each waste management unit (Unit), the Water Quality Protection Standard shall consist of all constituents of concern, the concentration limit for each constituent of concern, the point of compliance, and all water quality monitoring points.

The Water Quality Protection Standard for naturally occurring waste constituents consists of the constituents of concern, the concentration limits, and the point of compliance and all monitoring points. The Water Quality Protection Standard, or any modification thereto, shall be submitted in a report for review and approval.

The report shall:

- a. Identify **all distinct bodies of surface and ground water** that could be affected in the event of a release from a Unit or portion of a Unit. This list shall include at least the uppermost aquifer and any permanent or ephemeral zones of perched groundwater underlying the facility.
- b. Include a map showing the monitoring points and background monitoring points for the surface water monitoring program, groundwater monitoring program, and the unsaturated zone monitoring program. The map shall include the point of compliance in accordance with Title 27 CCR Section 20405.
- c. Evaluate the perennial direction(s) of groundwater movement within the uppermost groundwater zone(s).

The Water Quality Protection Standard shall be certified by a California-registered civil engineer or geologist as meeting the requirements of Title 27. If subsequent sampling of the background monitoring point(s) indicates significant water quality changes due to either seasonal fluctuations or other reasons unrelated to waste management activities at the site, the Discharger may request modification of the Water Quality Protection Standard.

If subsequent sampling of the background monitoring point(s) indicates significant water quality changes due to either seasonal fluctuations or other reasons unrelated to waste management activities at the site, the Discharger may request modification of the Water Quality Protection Standard.

2. Constituents of Concern

The constituents of concern include all the waste constituents, their reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the Unit. The constituents of concern for all Units at the facility are those listed in Tables I through VI for the specified

monitored medium, and Table IX. The Discharger shall monitor all constituents of concern every five years, or more frequently as required.

The last 5-year Constituent-of-Concern (COC) monitoring event was conducted during 2006; therefore, the next COC event is scheduled to take place in 2011. The Discharger shall monitor all constituents of concern every five years, or more frequently as required in accordance with a Corrective Action Program.

a. **Monitoring Parameters**

Monitoring parameters are constituents of concern that are the waste constituents, reaction products, hazardous constituents, and physical parameters that provide a reliable indication of a release from a Unit. The monitoring parameters for all Units are those listed in Tables I through VI for the specified monitored medium.

3. Concentration Limits

For a naturally occurring constituent of concern, the detection monitoring and corrective action concentration limit for each constituent of concern shall be determined as follows:

- a. By calculation in accordance with a statistical method pursuant to §20415(e)(8) of Title 27; or
- b. By an alternate statistical method the requirements of §20415(e)(8) of Title 27.
- c. Concentration limits greater than background (CLGB) for corrective action may be proposed by the discharger in accordance with §20430 of Title 27 if, after proposed corrective action measures reveal that it is technically and economically infeasible to achieve background levels.

The Discharger shall establish concentration limits for the following monitored mediums as follows:

1. Unsaturated Zone – With the exception of VOCs and certain biosolids monitoring parameters (for which a non-statistical method is used to determine concentration limits), the concentration limits for COCs in the unsaturated zone shall be based on statistical evaluation of historical monitoring data for each monitoring point, as proposed by the Discharger. These concentration limits shall be updated annually and included in each monitoring report.
2. Groundwater - With the exception of VOCs (for which a non-statistical method is used to determine concentration limits), the concentration limits for groundwater monitoring shall be based on a statistical evaluation of detection monitoring data.
 - a. The Discharger uses inter-well statistical methods to evaluate

groundwater quality in the detection monitoring wells. Under this approach, historical inorganic data are pooled from background monitoring wells to create a data set. The inter-well concentration limits are calculated using a tolerance limit method at 95% confidence and 95% coverage. The limits are updated annually. In this revised monitoring program, data from wells MW-1 and MW-3 will be pooled to create the background data set from which inter-well concentration limits are derived.

3. Surface Water – Concentration limits are calculated using the tolerance method based on historical data from upstream sampling location SW-1.

4. Point of Compliance

The point of compliance for the water standard at each Unit or portion of a Unit is a vertical surface located at the hydraulically down-gradient limit of the Unit that extends through the uppermost aquifer underlying the Unit. All point of compliance monitoring wells established for the detection monitoring program shall constitute the monitoring points for the groundwater Water Quality Protection Standard.

5. Compliance Period

The compliance period for each Unit shall be the number of years equal to the active life of the Unit plus the closure period. The compliance period is the minimum period during which the Discharger shall conduct a water quality monitoring program subsequent to a release from the Unit. The compliance period shall begin anew each time the Discharger initiates an evaluation monitoring program.

6. Due Date

The Water Quality Protection Standard Report is **due within 60 days of the date of this Order.**

D. MONITORING

The Discharger shall comply with the detection monitoring program provisions of Title 27 CCR for groundwater, surface water, and the unsaturated zone, in accordance with Detection Monitoring Specification E.2 and E.4 of Waste Discharge Requirements, Order No. R5-2009-0020. Detection monitoring for a new Unit shall be installed, operational, and one year of monitoring data collected **prior to** the discharge of wastes. All monitoring shall be conducted in accordance with a Sample Collection and Analysis Plan, which include quality assurance/quality control standards, that shall be submitted for review and approval.

All point of compliance monitoring wells established for the detection monitoring program shall constitute the monitoring points for the groundwater Water Quality

Protection Standard. All detection monitoring and corrective action monitoring program groundwater monitoring wells, unsaturated zone monitoring devices, leachate, and surface water monitoring points shall be sampled and analyzed for monitoring parameters and constituents of concern as indicated and listed in Tables I through VI, and Table IX.

Method detection limits and practical quantitation limits shall be reported. All peaks shall be reported, including those which cannot be quantified and/or specifically identified. Metals shall be analyzed in accordance with the methods listed in Table VIII.

The Discharger may use alternative analytical test methods, including new USEPA approved methods, provided the methods have method detection limits equal to or lower than the analytical methods specified in this Monitoring and Reporting Program.

For any given monitored medium, a sufficient number of samples shall be taken from all Monitoring Points and Background Monitoring Points to satisfy the data analysis requirements for a given Reporting Period, and shall be taken in a manner that ensures sample independence to the greatest extent feasible. Collection of samples shall be in accordance with procedures set forth in a Sample Collection and Analysis Plan.

1. Groundwater

The Discharger shall operate and maintain a groundwater detection monitoring system that complies with the applicable provisions of Title 27 CCR Sections 20415 and 20420 in accordance with an approved Detection Monitoring Program. The detection monitoring system shall be certified by a California-licensed professional civil engineer or geologist as meeting the requirements of Title 27. The Discharger shall collect, preserve, and transport groundwater samples in accordance with an approved Sample Collection and Analysis Plan.

The monitoring well network (Attachment C) currently consists of background monitoring wells MW-1, MW-2 and MW-3, detection monitoring wells MW-4 through MW-8, MW-16, T-1, T-2, and corrective action Piezometers PZ-11, PZ-12, PZ-13 and any other monitoring points installed at the landfill. The piezometers were installed to monitor ephemerally perched water within the vadose zone north of Cells 1A and 2A as a part of the corrective action monitoring program. As the landfill expands, additional detection monitoring wells (MW-9 through MW-17) shall be installed at the approximate locations near the boundaries of the landfill as shown on Attachment C. In addition, interim monitoring wells shall be installed and monitored to provide the earliest possible detection of a release to groundwater. The wells are considered interim because they will be located within the permitted landfill footprint. As new landfill cells are constructed, the wells shall be properly destroyed prior to landfill cell construction and only with Executive Officer review and approval. Detection monitoring well MW-4, MW-6 and MW-8 are currently interim monitoring wells located immediately downgradient of Cells 1A and 1B (Attachment C). Two additional interim wells (T-1 and T-2) have been

constructed downgradient of Cell 1B. Three additional interim wells (T-3, T-4, and T-5) shall be constructed prior to the construction of the Biosolids Management Facility and/or Cells 8A and 8B at the approximate locations shown on Attachment C.

MW-2 shall be transferred to the detection monitoring program because as the landfill has expanded eastward, waste has been placed in a Unit located adjacent to MW-2. While there are no indications of impacts to MW-2, its location is now cross-gradient and/or downgradient from waste rather than upgradient. Background monitoring well MW-3 shall be re-assigned as a detection monitoring well as the landfill expands to the east and Cells 3A and Cell 3B are constructed. Any additional monitoring wells constructed at the site as new cells are constructed shall be added to the monitoring network.

The Discharger shall determine the groundwater flow rate and direction in the uppermost aquifer and in any zones of perched water and in any additional zone of saturation monitored pursuant to this Monitoring and Reporting Program, and report the results semi-annually, including the times of highest and lowest elevations of the water levels in the wells and piezometers.

Hydrographs of each well shall be submitted showing the elevation of groundwater with respect to the elevations of the top and bottom of the screened interval and the elevation of the pump intake. Hydrographs of each well shall be prepared quarterly and submitted annually.

Groundwater samples shall be collected from the point-of-compliance wells, background wells, piezometers, and any additional wells added as part of the approved groundwater monitoring system. Samples shall be collected and analyzed for the monitoring parameters in accordance with the methods and frequency specified in Tables I-A and I-B.

The monitoring parameters shall also be evaluated each reporting period with regards to the cation/anion balance, and the results shall be graphically presented using a Stiff diagram, a Piper graph, or a Schueller plot. Samples for the constituents of concern specified in Tables I-A and I-B shall be collected and analyzed in accordance with the methods listed in Table IX every five years.

The last 5-year Constituent-of-Concern (COC) groundwater monitoring event was conducted during the fourth quarter of 2006; therefore, the next COC event is scheduled to take place in the fourth quarter of the year 2011.

2. Unsaturated Zone Monitoring

The Discharger shall operate and maintain an unsaturated zone detection monitoring system that complies with the applicable provisions of Title 27 CCR Sections 20415 and 20420 in accordance with an approved Detection Monitoring Program. The Discharger shall collect, preserve, and transport

samples in accordance with the quality assurance/quality control standards contained in an approved Sample Collection and Analysis Plan.

Unsaturated zone samples shall be collected from the monitoring devices of the approved unsaturated zone monitoring system (Attachment C) and any other pan lysimeters or other unsaturated zone monitoring points installed as the additional landfill modules are constructed. The unsaturated zone monitoring points consist of background suction lysimeter VZ-1, detection monitoring point PL-2B, corrective action monitoring suction lysimeter VZ-2 (located beneath the clay liner which underlies PL-1A), and corrective action monitoring PL-1A, PL-2A, and PL-1B. Collected samples shall be analyzed for the listed constituents in accordance with the methods and frequency specified in Table II. All monitoring parameters shall be graphed annually so as to show historical trends at each monitoring point. Samples for the constituents of concern specified in Table II shall be collected and analyzed in accordance with the methods listed in Table VIII every five years.

Pan lysimeters shall be checked monthly for liquid and monitoring shall also include the total volume of liquid removed from the system. Unsaturated zone monitoring reports shall be included with the corresponding semiannual groundwater monitoring and shall include an evaluation of potential impacts of the facility on the unsaturated zone and compliance with the Water Quality Protection Standard.

The last 5-year Constituent-of-Concern (COC) vadose zone monitoring event was conducted during the fourth quarter of 2006; therefore, the next COC event is scheduled to take place in the fourth quarter of the year 2011.

Land Treatment Unit (LTU)

Unsaturated zone monitoring of the LTU shall be conducted in accordance with Title 27 CCR Section 20435. LTU monitoring will be conducted by installing one soil boring per acre of the (10.5-acre) LTU area. Background borings to be installed at the beginning of the drying season (prior to application of sludge). Detection borings to be installed at end of drying season (after sludge is removed) immediately beneath the treatment zone (no deeper than 6 feet below ground surface as described in the RWD/JTD). Samples shall be analyzed in accordance with Tables II-B and II-C.

3. Gas Monitoring

Perimeter probes, leak detection sumps, and pan lysimeters shall be monitored as a part of the unsaturated zone landfill gas detection monitoring program on a quarterly basis for the presence of methane, carbon dioxide, and oxygen using field instrumentation (Table III). If methane is detected with a gas meter in a perimeter probe, pan lysimeter, or leak detection sump at a concentration greater than 1.0 percent AND organic vapors are detected with a

photoionization detector (PID) at a concentration greater than 1.0 part per million (ppm), then a gas sample shall be obtained and analyzed for specific VOCs using EPA Method TO-15 (Table III). The PID monitoring for VOCs shall be conducted with calibration to a hexane standard or other straight-chain, fuel-related hydrocarbon. Conversion to benzene-equivalents shall be conducted using a response factor for benzene provided by the manufacturer. Gas control measures shall be implemented for a Class II module upon the detection of gas-phase concentrations of VOCs as specified in Facility Specification C.15 of WDRs Order No. R5-2009-0020.

The Discharger shall conduct verification testing (see Detection Monitoring Specification E.20.b in WDRs Order No. R5-2009-0020) if the data meet either of the trigger conditions of Detection Monitoring Specifications E.20. in WDRs Order No. R5-2009-0020 to determine whether a release of VOCs has occurred.

4. Leachate Monitoring/Seeps

Leachate collection sumps include Sump 1-A, Sump 1-B, Sump 2A (also referred to as Sump 2.1), Sump 2-B (also referred to as Sump 2.3) and any other sump installed as the additional landfill modules are constructed. All Unit leachate collection and removal system sumps shall be inspected **monthly** for leachate generation. Upon detection of leachate in a previously dry leachate collection and removal system, leachate shall be sampled **immediately** and analyzed for the constituents listed in Table IV. Leachate shall then be sampled and analyzed annually during the fourth quarter thereafter, with a retest during the following second quarter if constituents are detected that have not been previously detected. Leachate samples shall be collected and analyzed for the listed constituents in accordance with the methods and frequency specified in Table IV. The constituents of concern list shall include all constituents listed in Table IX. The quantity of leachate pumped from each sump shall be measured and reported monthly as Leachate Flow Rate (in gallons).

Leachate which seeps to the surface from the Unit and extends out of any Unit, shall be sampled and analyzed for the Monitoring Parameters and Constituents of Concern listed in Table IV upon detection. The quantity of leachate shall be *estimated* and reported as Leachate Flow Rate (in gallons/day). Also, refer to Section E.4, below.

5. Leak Detection Monitoring

Leak detection layer sumps include LD-1B, LD-2B, LD-Cell 2 Phase 4, LD-Cell 3 Phase 1 (North) and LD-Cell 3 Phase 1 (South) and any other leak detection layer sumps added as the additional landfill modules are constructed. Leak detection layer sumps in the double liner systems shall be checked **semi-annually** for the presence of liquid and the Discharger shall notify the Regional Water Board within **one week** if liquid has been observed. Liquid samples shall be analyzed for Total Dissolved Solids (TDS), chloride and bicarbonate (Table V) to determine the origin of the liquid. If sampling indicates evidence of a

release, then confirmation activities described in Detection Monitoring Specifications E.21 and Title 27 Section 20420(j) shall be performed. All remaining liquid shall be pumped out of the leak detection layer within 48 hours.

The leak detection layer shall be monitored in accordance with Table V and the LFG monitoring specified in Section D.3.

6. Surface Water Monitoring

The Discharger shall maintain an approved surface water detection monitoring system where appropriate that complies with the applicable provisions of Title 27 CCR Sections 20415 and 20420 in accordance with an approved Detection Monitoring Program.

For all monitoring points assigned to surface water detection monitoring, samples shall be collected and analyzed for the monitoring parameters in accordance with the methods and frequency specified in Table VI. The surface water monitoring points shall consist of SW-1 and SW-3 (Attachment C).

As the site is located on relatively flat topography, surface water run-on to the site from adjacent roads and agricultural fields is limited. Most surface water run-off results from precipitation on covered portions of the landfill and this run-off is routed to sedimentation basins. When water accumulates in the sedimentation basins and is settled, the water is pumped into drainage ditches that flow to the southern boundary of the site, which eventually discharges to Best Slough. Surface water locations SW-1 (upgradient) and SW-3 (downgradient) in Best Slough shall be sampled annually during the first storm event of the rainy season that requires discharge (pumping) from the sites sedimentation basins. Precipitation or run-off that comes in contact with an active area of the landfill containing waste shall be directed to the LCRS using earthen berms and drains constructed in the operations layer.

All surface water monitoring samples shall be collected and analyzed for the constituents of concern specified in Table IX every five years. All monitoring parameters shall be graphed annually so as to show historical trends at each sample location.

Surface water samples shall also be collected when leachate seeps are observed that may have impacted surface water quality. If leachate seeps are identified extending out of the disposal area or that potentially impact on-site drainages, those drainages shall be sampled as close to the leachate as possible.

The last 5-year Constituent-of-Concern (COC) surface water monitoring event was conducted during the fourth quarter of 2006; however, no surface water sample was collected as no discharge from the sedimentation basins was occurring. Analysis for 5-year COCs occurred in first quarter 2007 when flow was present. The next COC event is scheduled to take place in the fourth quarter of the year 2011.

7. Storm Water Monitoring

Storm water monitoring shall be conducted in accordance with the NPDES General Permit for Storm Water Discharges Associated with Industrial Activities (Water Quality Order No. 97-03-DWG, NPDES No. CAS000001). The Discharger shall submit a copy of the storm water Annual Report with the first semi-annual monitoring report for each year submitted under this program.

8. Semi-Solid Waste Monitoring

Semi-solid wastes discharged to the waste pile and LTU shall be monitored in accordance to the parameters and frequency specified in Table VII.

9. Facility Monitoring

a. Facility Inspection

Annually, prior to the anticipated rainy season, but no later than **15 August**, the Discharger shall conduct an inspection of the facility. The inspection shall assess damage to the drainage control system, groundwater monitoring equipment (including wells, etc.). By **15 September of each year**, the Discharger shall submit to the Regional Water Board a Winterization Plan describing measures planned to prepare the site and conduct operations during the wet season.

Any necessary erosion control measures shall be implemented, and any necessary construction, maintenance, or repairs of precipitation and drainage control facilities shall be completed to prevent erosion or flooding of the facility and to prevent surface drainage from contacting or percolating through wastes by **15 October**. The Discharger shall submit an Annual Winterization Report (AWR) to the Regional Water Board describing the results of the inspection, implementation of the Winterization Plan, and measures taken to comply with this specification report, including photographs of the problem and the repairs. The AWR may be included in the Annual Report submitted under Monitoring and Reporting Program No. R5-2009-0020.

b. Storm Events

The Discharger shall inspect all precipitation, diversion, and drainage facilities for damage **within 7 days** following *major storm events*. Necessary interim repairs shall be completed **within 10 days** of the inspection and permanent repairs shall be completed when feasible. The Discharger shall report any damage and subsequent repairs within 45 days of completion of the repairs, including photographs of the problem and the repairs.

c. Standard Observations

Each monitoring report shall include a summary and certification of completion of all Standard Observations for the waste management unit, for the perimeter of the landfill module, and for the receiving waters. The standard observations shall include those elements identified in Section E.3.f, below, and shall be performed at the required frequencies.

E. REPORTING REQUIREMENTS

1. The Discharger shall retain records of all monitoring information, including all calibration and maintenance records, all original strip chart recordings of continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order. Records shall be maintained throughout the life of the facility including the post closure period.

Such legible records shall show the following for each sample:

- a. Sample identification and the monitoring point or background monitoring point from which it was taken, along with the identity of the individual who obtained the sample;
 - b. Date, time, and manner of sampling;
 - c. Date and time that analyses were started and completed, and the name of the personnel and laboratory performing each analysis;
 - d. Complete procedure used, including method of preserving the sample, and the identity and volumes of reagents used;
 - e. Calculation of results; and
 - f. Results of analyses, and the MDL and PQL for each analysis.
2. A transmittal letter explaining the essential points shall accompany each report. At a minimum, the transmittal letter shall identify any violations found since the last report was submitted, and if the violations were corrected. If no violations have occurred since the last submittal, this shall be stated in the transmittal letter. The transmittal letter shall also state that a discussion of any violations found since the last report was submitted, and a description of the actions taken or planned for correcting those violations, including any references to previously submitted time schedules, is contained in the accompanying report.
 3. Each monitoring report shall include a compliance evaluation summary. The summary shall contain at least:

- a. For each monitoring point and background monitoring point addressed by the report, a description of:
 - 1) The time of water level measurement;
 - 2) The type of pump - or other device - used for purging and the elevation of the pump intake relative to the elevation of the screened interval;
 - 3) The method of purging (the pumping rate; the equipment and methods used to monitor field pH, temperature, and conductivity during purging; the calibration of the field equipment; results of the pH, temperature, conductivity, and turbidity testing; and the method of disposing of the purge water) to remove all portions of the water that was in the well bore while the sample was being taken;
 - 4) The type of pump - or other device - used for sampling, if different than the pump or device used for purging; and
 - 5) A statement that the sampling procedure was conducted in accordance with the approved Sample Collection and Analysis Plan.
- b. A map or aerial photograph showing the locations of observation stations, monitoring points, and background monitoring points.
- c. For each groundwater body, a description and graphical presentation of the gradient and direction of groundwater flow under/around the Unit, and the groundwater flow rate, based upon water level elevations taken prior to the collection of the water quality data submitted in the report.
- d. Laboratory statements of results of all analyses evaluating compliance with requirements.
- e. An evaluation of the effectiveness of the leachate monitoring and control facilities, and of the run-off/run-on control facilities.
- f. A summary and certification of completion of all **Standard Observations** for the Unit(s), for the perimeter of the Unit, and for the receiving waters. Standard observations for ACTIVE landfill units shall be conducted **weekly** during the wet season (1 October to 30 April) and **monthly** during the dry season (1 May to 30 September). Standard observations for INACTIVE or CLOSED landfill units shall be conducted **monthly** during the wet season (1 October to 30 April) and **quarterly** during the dry season (1 May to 30 September). The Standard Observations shall include:
 - 1) For the Unit:
 - a) Evidence of ponded water at any point on the facility (show affected area on map);

- b) Evidence of odors - presence or absence, characterization, source, and distance of travel from source; and
 - c) Evidence of erosion and/or of day-lighted refuse.
 - 2) Along the perimeter of the Unit:
 - a) Evidence of liquid leaving or entering the Unit, estimated size of affected area, and flow rate (show affected area on map);
 - b) Evidence of odors - presence or absence, characterization, source, and distance of travel from source; and
 - c) Evidence of erosion and/or of day-lighted refuse.
 - 3) For receiving waters:
 - a) Floating and suspended materials of waste origin - presence or absence, source, and size of affected area;
 - b) Discoloration and turbidity - description of color, source, and size of affected area;
 - c) Evidence of odors - presence or absence, characterization, source, and distance of travel from source;
 - d) Evidence of water uses - presence of water-associated wildlife;
 - e) Flow rate; and
 - f) Weather conditions - wind direction and estimated velocity, total precipitation during recent days and on the day of observation.
 - g. The quantity and types of wastes discharged and the locations in the Unit where waste has been placed since submittal of the last such report.
- 4. The Discharger shall report by telephone any seepage from the disposal area **immediately** after it is discovered. A written report shall be filed with the Regional Water Board **within seven days**, containing at least the following information:
 - a. A map showing the location(s) of seepage;
 - b. An estimate of the flow rate;
 - c. A description of the nature of the discharge (e.g., all pertinent observations and analyses);

- d. Verification that samples have been submitted for analyses of the Constituents of Concern and Monitoring Parameters, and an estimated date that the results will be submitted to the Regional Water Board; and
 - e. Corrective measures underway or proposed, and corresponding time schedule.
5. The Discharger shall submit an **Annual Monitoring Summary Report** to the Regional Water Board covering the reporting period of the previous monitoring year. This report shall contain:
- a. All monitoring parameters and constituents of concern shall be graphed so as to show historical trends at each monitoring point and background monitoring point, for all samples taken within at least the previous five calendar years. Each such graph shall plot the concentration of one or more constituents for the period of record for a given monitoring point or background monitoring point, at a scale appropriate to show trends or variations in water quality. The graphs shall plot each datum, rather than plotting mean values. For any given constituent or parameter, the scale for background plots shall be the same as that used to plot down-gradient data. Graphical analysis of monitoring data may be used to provide significant evidence of a release.
 - b. Unless otherwise exempted, all monitoring analytical data obtained during the previous two six-month reporting periods, shall be submitted in tabular form as well as in a digital file format. The Regional Water Board regards the submittal of data in hard copy and in digital format as "...the form necessary for..." statistical analysis [§20420(h)], in that this facilitates periodic review by the Regional Water Board.
 - c. A comprehensive discussion of the compliance record, and the result of any corrective actions taken or planned which may be needed to bring the Discharger into full compliance with the waste discharge requirements.
 - d. A map showing the area and elevations in which filling has been completed during the previous calendar year and a comparison to final closure design contours.
 - e. A written summary of the monitoring results, indicating any changes made or observed since the previous annual report.
 - f. An evaluation of the effectiveness of the leachate monitoring/control facilities, including the results of the annual testing of leachate collection and removal systems required under VIII.P of the Standard Provisions and Reporting Requirements.
6. The Discharger shall submit a report on the effectiveness of the corrective action program in accordance with Title 27 CCR Section 20430(h) to the Regional Water Board semi-annually. This report may be included in the Semi-

Annual Monitoring Report submitted under Monitoring and Reporting Program No. R5-2009-0020.

7. Annually, prior to the anticipated rainy season but no later than **15 October**, any necessary erosion control measures shall be implemented, and any necessary construction, maintenance, or repairs of precipitation and drainage control facilities shall be completed to prevent erosion or flooding of the facility and to prevent surface drainage from contacting or percolating through wastes. By **15 September of each year**, the Discharger shall submit to the Board a Winterization Plan describing measures planned to prepare the site and conduct operations during the wet season. The Discharger shall submit an Annual Winterization Report (AWR) to the Regional Water Board describing implementation of the Winterization Plan and measures taken to comply with this specification. The AWR may be included in the Annual Report submitted under Monitoring and Reporting Program No. R5-2009-0020.

Ordered by: _____
PAMELA C. CREEDON, Executive Officer

5 February 2009
(Date)

JSH: 02/05/09

TABLE I-A
GROUNDWATER BACKGROUND AND DETECTION MONITORING PROGRAM

<u>Parameter</u>	<u>Units</u>	<u>Frequency*</u>
Field Parameters		
Groundwater Elevation	Ft. & hundredths, M.S.L.	Quarterly
Temperature	°C	Semi-Annual
Electrical Conductivity	µmhos/cm	Semi-Annual
pH	pH units	Semi-Annual
Turbidity	Turbidity units	Semi-Annual
Monitoring Parameters		
Total Dissolved Solids (TDS)	mg/L	Semi-Annual
Chloride	mg/L	Semi-Annual
Carbonate	mg/L	Semi-Annual
Bicarbonate	mg/L	Semi-Annual
Nitrate - Nitrogen	mg/L	Semi-Annual
Sulfate	mg/L	Semi-Annual
Calcium ¹	mg/L	Semi-Annual
Magnesium ¹	mg/L	Semi-Annual
Potassium ¹	mg/L	Semi-Annual
Sodium ¹	mg/L	Semi-Annual
Volatile Organic Compounds (USEPA Method 8260, see Table VII)	µg/L	Semi-Annual
Ammonia ²	mg/L	Semi-Annual
Nitrite – Nitrogen ²	mg/L	Semi-Annual
Total Kjeldahl Nitrogen ²	mg/L	Semi-Annual
Constituents of Concern (see Table VIII)		
Total Organic Carbon	mg/L	5 years
Fecal Coliform ²	100 mpn/100ml	5 years
Inorganics (dissolved)	mg/L	5 years
Volatile Organic Compounds (USEPA Method 8260B, extended list)	µg/L	5 years
Semi-Volatile Organic Compounds (USEPA Method 8270C)	µg/L	5 years
Chlorophenoxy Herbicides (USEPA Method 8151A)	µg/L	5 years
Organophosphorus Compounds (USEPA Method 8141A)	µg/L	5 years

1. Concentration limits are not required for these constituents.

2. Monitoring parameters for Biosolids Management Facility monitoring wells.

TABLE I-B
GROUNDWATER CORRECTIVE ACTION PIEZOMETERS MONITORING PROGRAM

<u>Parameter</u>	<u>Units</u>	<u>Frequency*</u>
Field Parameters		
Groundwater Elevation	Ft. & hundredths, M.S.L.	Quarterly
Temperature	°C	Quarterly
Electrical Conductivity	µmhos/cm	Quarterly
pH	pH units	Quarterly
Turbidity	Turbidity units	Quarterly
Monitoring Parameters		
Total Dissolved Solids (TDS)	mg/L	Quarterly
Chloride	mg/L	Quarterly
Carbonate	mg/L	Quarterly
Bicarbonate	mg/L	Quarterly
Nitrate - Nitrogen	mg/L	Quarterly
Sulfate	mg/L	Quarterly
Calcium ¹	mg/L	Quarterly
Magnesium ¹	mg/L	Quarterly
Potassium ¹	mg/L	Quarterly
Sodium ¹	mg/L	Quarterly
Volatile Organic Compounds (USEPA Method 8260, see Table VII)	µg/L	Quarterly
Constituents of Concern (see Table VIII)		
Total Organic Carbon	mg/L	5 years
Inorganics (dissolved)	mg/L	5 years
Volatile Organic Compounds (USEPA Method 8260B, extended list)	µg/L	5 years
Semi-Volatile Organic Compounds (USEPA Method 8270C)	µg/L	5 years
Chlorophenoxy Herbicides (USEPA Method 8151A)	µg/L	5 years
Organophosphorus Compounds (USEPA Method 8141A)	µg/L	5 years

1. Concentration limits are not required for these constituents.

TABLE II-A
UNSATURATED ZONE MONITORING PROGRAM

<u>Parameter</u>	<u>Units</u>	<u>Frequency*</u>
Field Parameters		
Electrical Conductivity	µmhos/cm	Semi-Annual
pH	pH units	Semi-Annual
Monitoring Parameters		
Total Dissolved Solids (TDS)	mg/L	Semi-Annual
Chloride	mg/L	Semi-Annual
Carbonate	mg/L	Semi-Annual
Bicarbonate	mg/L	Semi-Annual
Nitrate - Nitrogen	mg/L	Semi-Annual
Sulfate	mg/L	Semi-Annual
Calcium ¹	mg/L	Semi-Annual
Magnesium ¹	mg/L	Semi-Annual
Potassium ¹	mg/L	Semi-Annual
Sodium ¹	mg/L	Semi-Annual
Volatile Organic Compounds (USEPA Method 8260B, see Table VII)	µg/L	Semi-Annual
Constituents of Concern (see Table VIII)		
Total Organic Carbon	mg/L	5 years
Inorganics (dissolved)	mg/L	5 years
Volatile Organic Compounds (USEPA Method 8260B, extended list)	µg/L	5 years
Semi-Volatile Organic Compounds (USEPA Method 8270C)	µg/L	5 years
Chlorophenoxy Herbicides (USEPA Method 8151A)	µg/L	5 years
Organophosphorus Compounds (USEPA Method 8141A)	µg/L	5 years

1. Concentration limits are not required for these constituents.

TABLE II-B
UNSATURATED ZONE MONITORING PROGRAM
LAND TREATMENT UNIT – Soil Pore Water¹

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u>
Field Parameters		
pH	pH units	Twice per year ¹
Monitoring Parameters		
Total Dissolved Solids	mg/L	Twice per year ²
Chloride	mg/L	Twice per year ²
Ammonia	mg/L	Twice per year ²
Nitrate	mg/L	Twice per year ²
Nitrite	mg/L	Twice per year ²
Sulfate	mg/L	Twice per year ²
Total Kjeldahl Nitrogen	mg/L	Twice per year ²
Volatile Organic Compounds (USEPA Method 8260B, extended list)	ug/L	Twice per year ²
Constituents of Concern		
Metals ³	mg/L	5 years
Fecal coliform	mg/L	5 years
Total Organic Carbon	mg/L	5 years
Semi-volatile organic compounds	ug/L	5 years
Organophosphorus pesticides	ug/L	5 years
Chlorinated herbicides	ug/L	5 years
PCBs	ug/L	5 years

Notes:

1. If pore water cannot be extracted from samples, proceed with soil analysis per Table II-C-2.
2. One sample shall be taken at each monitoring location before the drying season (prior to sludge application) and one at the end of the drying season (after sludge is removed).

TABLE II-C
UNSATURATED ZONE MONITORING PROGRAM
LAND TREATMENT UNIT - Soil

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u>
Field Parameters		
Moisture	percent	Twice per year ¹
pH	pH units	Twice per year ¹
Monitoring Parameters		
Chloride	mg/L	Twice per year ²
Ammonia	mg/L	Twice per year ²
Nitrate	mg/L	Twice per year ²
Nitrite	mg/L	Twice per year ²
Sulfate	mg/L	Twice per year ²
Total Kjeldahl Nitrogen	mg/L	Twice per year ²
Volatile Organic Compounds (USEPA Method 8260B, extended list)	ug/L	Twice per year ²
Constituents of Concern		
Metals ³	mg/L	5 Years
Fecal coliform	mg/L	5 Years
Total Organic Carbon	mg/L	5 Years
Semi-volatile organic compounds	ug/L	5 Years
Organophosphorus pesticides	ug/L	5 Years
Chlorinated herbicides	ug/L	5 Years
PCBs	ug/L	5 Years

Notes:

1. One sample shall be taken at each monitoring location before the drying season (prior to sludge application) and one at the end of the drying season (after sludge is removed).
2. Samples shall be taken at end of drying season after sludge removal immediately below the treatment zone of 5 feet but not to exceed 6 feet in depth. Monitor soil for these constituents only when pore water samples cannot be extracted from soil. Use WET test for extraction and see Table IX for constituent test methods.
3. Metals (Ag, Al, As, Ba, Be, Cd, Cr, Co, Cu, Fe, Hg, Pb, Ni, Sb, Se, Ti, V, Zn).

TABLE III
GAS MONITORING PROGRAM

Landfill Gas Detection Monitoring Program

Location	Landfill Gas Monitoring Parameters				VOCs By
	Methane	Carbon Dioxide	Oxygen	Organic vapors	EPA TO-15
All perimeter probes, leak detection sumps, and pan lysimeters.	Quarterly	Quarterly	Quarterly	Quarterly	If detected*
<p>LFG Field Monitoring using GEM 500 (or approved equivalent) for LFG and portable Photo Ionization Detector (PID) Meter for VOCs. The PID shall be calibrated and results presented as benzene equivalents.</p> <p>* If methane is detected with a gas meter at a concentration greater than 1.0 percent by volume AND organic vapors are detected with a PID at a concentration greater than 1.0 ppm, then a gas sample shall be obtained and analyzed for specific VOCs using EPA Method TO-15 (Table V).</p>					

TABLE IV
LEACHATE/SEEP DETECTION MONITORING PROGRAM

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u>
Field Parameters		
Total Flow	Gallons	Weekly
Flow Rate	Gallons/Day	Weekly
Electrical Conductivity	µmhos/cm	Annually
pH	pH units	Annually
Monitoring Parameters		
Total Dissolved Solids (TDS)	mg/L	Annually
Chloride	mg/L	Annually
Carbonate	mg/L	Annually
Bicarbonate	mg/L	Annually
Nitrate - Nitrogen	mg/L	Annually
Sulfate	mg/L	Annually
Calcium	mg/L	Annually
Magnesium	mg/L	Annually
Potassium	mg/L	Annually
Sodium	mg/L	Annually
Volatile Organic Compounds (USEPA Method 8260B, see Table VII)	µg/L	Annually
Constituents of Concern (see Table VIII)		
Total Organic Carbon	mg/L	5 years
Inorganics (dissolved)	mg/L	5 years
Volatile Organic Compounds (USEPA Method 8260B, extended list)	µg/L	5 years
Semi-Volatile Organic Compounds (USEPA Method 8270C)	µg/L	5 years
Chlorophenoxy Herbicides (USEPA Method 8151A)	µg/L	5 years
Organophosphorus Compounds (USEPA Method 8141A)	µg/L	5 years

TABLE V
LEAK DETECTION MONITORING*
(Semi-Annually)

Location	Liquid Analysis (if present)
All leak detection layer sumps	Total Dissolved Solids
	Chloride
	Bicarbonate

* For LFG portion of the leak detection monitoring refer to Table III.

TABLE VI
SURFACE WATER DETECTION MONITORING PROGRAM

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u> *
Field Parameters		
Temperature	°C	Annually
Electrical Conductivity	µmhos/cm	Annually
pH	pH units	Annually
Monitoring Parameters		
Total Dissolved Solids (TDS)	mg/L	Annually
Bicarbonate Alkalinity	mg/L	Annually
Chloride	mg/L	Annually
Nitrate as Nitrogen	mg/L	Annually
Volatile Organic Compounds (USEPA Method 8260B, see Table VII)	µg/L	Annually
Constituents of Concern (see Table VIII)		
Inorganics (dissolved)	mg/L	5 years
Volatile Organic Compounds (USEPA Method 8260B, extended list)	µg/L	5 years
Semi-Volatile Organic Compounds (USEPA Method 8270C)	µg/L	5 years
Chlorophenoxy Herbicides (USEPA Method 8151A)	µg/L	5 years
Organophosphorus Compounds (USEPA Method 8141A)	µg/L	5 years

* Surface water samples shall be collected during the first storm that produces runoff and when leachate seeps are observed that may have impacted surface water quality. If leachate seeps are identified extending out of the disposal area or that potentially impact on-site drainages, those drainages shall be sampled as close to the leachate as possible.

TABLE VII

SEMISOLID WASTE MONITORING PROGRAM

Waste Pile

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u>
Type of material discharged	-----	Semi-Annual
Quantity discharged	cubic yards, wet tons	Semi-Annual
Moisture Content ¹	percent	Semi-Annual
Capacity of unit/module remaining	percent	Semi-Annual

1. Biosolids discharged to the surface impoundment(s) shall not contain any free liquids per Prohibition A.11 of WDRs.

Land Treatment Unit

<u>Parameter</u>	<u>Units</u>	<u>Frequency</u>
Initial sludge depth	inches and # of lifts	Monthly
Quantity discharged	cubic yards, wet tons	Monthly
Moisture Content	percent	Monthly
Location within LTU	quadrant	Monthly
Quantity removed	cubic yards, wet tons	Monthly
Moisture content	percent	Monthly
Location within LTU	quadrant	Monthly
Disposition	-----	Monthly
Final sludge depth	inches and # of lifts	Monthly
Area covered	acres	Monthly
Total drying cycles during period	-----	Monthly
Cumulative LTU area covered	acres	Monthly

TABLE VIII

MONITORING PARAMETERS FOR DETECTION MONITORING

Surrogates for Metallic Constituents:

pH
Total Dissolved Solids
Electrical Conductivity
Chloride
Sulfate
Nitrate nitrogen

Constituents included in VOC:

USEPA Method 8260B

Acetone
Acrylonitrile
Tert-Amyl ethyl ether
Benzene
Bromobenzene
Bromochloromethane
Bromodichloromethane
Bromoform (Tribromomethane)
n-Butylbenzene
sec-Butylbenzene
tert-Butylbenzene
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane (Ethyl chloride)
Chloroform (Trichloromethane)
Dibromochloromethane (Chlorodibromomethane)
1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dibromoethane (Ethylene dibromide; EDB)
o-Dichlorobenzene (1,2-Dichlorobenzene)
m-Dichlorobenzene (1,3-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
trans-1,4-Dichloro-2-butene
Dichlorodifluoromethane (CFC-12)
1,1-Dichloroethane (Ethylidene chloride)
1,2-Dichloroethane (Ethylene dichloride)
1,1 -Dichloroethylene (1,1 -Dichloroethene; Vinylidene chloride)
cis- 1,2-Dichloroethylene (cis- 1,2-Dichloroethene)
trans-1,2-Dichloroethylene (trans-1,2-Dichloroethene)
1,2-Dichloropropane (Propylene dichloride)
cis- 1,3-Dichloropropene
trans- 1,3-Dichloropropene
Di-isopropylether (DIPE)
1,4 Dioxane
Ethanol

TABLE VIII
MONITORING PARAMETERS FOR DETECTION MONITORING

Continued

di-Isopropyl ether
Ethyltertiary butyl ether
Ethylbenzene
2-Hexanone (Methyl butyl ketone)
Hexachlorobutadiene
Hexachloroethane
Methyl bromide (Bromomethene)
Methyl chloride (Chloromethane)
Methylene bromide (Dibromomethane)
Methylene chloride (Dichloromethane)
Methyl ethyl ketone (MEK: 2-Butanone)
Methyl iodide (Iodomethane)
Methyl t-butyl ether
4-Methyl-2-pentanone (Methyl isobutylketone)
Naphthalene
2-Nitropropane
n-Propylbenzene
Styrene
Tertiary amyl methyl ether
Tertiary butyl alcohol
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene)
Toluene
1,2,4-Trichlorobenzene
1,1,1-Trichloroethane (Methylchloroform)
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene)
Trichlorofluoromethane (CFC- 11)
1,2,3-Trichloropropane
1,2,4-Trimethylbenzene
1,3,5-Trimethylbenzene
Vinyl acetate
Vinyl chloride
Xylenes (total)

TABLE IX
CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

<u>Inorganics (dissolved):</u>	<u>USEPA Method</u>
Aluminum	6010
Antimony	7041
Barium	6010
Beryllium	6010
Cadmium	7131A
Chromium	6010
Cobalt	6010
Copper	6010
Silver	6010
Tin	6010
Vanadium	6010
Zinc	6010
Iron	6010
Manganese	6010
Arsenic	7062
Lead	7421
Mercury	7470A
Nickel	7521
Selenium	7742
Thallium	7841
Cyanide	9010B
Sulfide	9030B

Volatile Organic Compounds:

USEPA Method 8260

Acetone
 Acetonitrile (Methyl cyanide)
 Acrolein
 Acrylonitrile
 Allyl chloride (3-Chloropropene)
 Tert-Amyl ethyl ether
 Benzene
 Bromobenzene
 Bromochloromethane (Chlorobromomethane)
 Bromodichloromethane (Dibromochloromethane)
 Bromoform (Tribromomethane)
 n-Butylbenzene
 sec-Butylbenzene
 tert-Butylbenzene
 Carbon disulfide
 Carbon tetrachloride
 Chlorobenzene
 Chloroethane (Ethyl chloride)
 Chloroform (Trichloromethane)
 Chloroprene
 Dibromochloromethane (Chlorodibromomethane)
 1,2-Dibromo-3-chloropropane (DBCP)

TABLE IX

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS
Continued

1,2-Dibromoethane (Ethylene dibromide; EDB)
o-Dichlorobenzene (1,2-Dichlorobenzene)
m-Dichlorobenzene (1,3-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
trans- 1,4-Dichloro-2-butene
Dichlorodifluoromethane (CFC 12)
1,1 -Dichloroethane (Ethylidene chloride)
1,2-Dichloroethane (Ethylene dichloride)
1,1 -Dichloroethylene (1, 1-Dichloroethene; Vinylidene chloride)
cis- 1,2-Dichloroethylene (cis- 1,2-Dichloroethene)
trans- 1,2-Dichloroethylene (trans- 1,2-Dichloroethene)
1,2-Dichloropropane (Propylene dichloride)
1,3-Dichloropropane (Trimethylene dichloride)
2,2-Dichloropropane (Isopropylidene chloride)
1,1 -Dichloropropene
cis- 1,3-Dichloropropene
trans- 1,3-Dichloropropene
Di-isopropylether (DIPE)
1,4-Dioxane
Ethanol
Ethyltertiary butyl ether
Ethylbenzene
Ethyl methacrylate
Hexachlorobutadiene
Hexachloroethane
2-Hexanone (Methyl butyl ketone)
Isobutyl alcohol
Methacrylonitrile
Methyl bromide (Bromomethane)
Methyl chloride (Chloromethane)
Methyl ethyl ketone (MEK; 2-Butanone)
Methyl iodide (Iodomethane)
Methyl t-butyl ether
Methyl methacrylate
4-Methyl-2-pentanone (Methyl isobutyl ketone)
Methylene bromide (Dibromomethane)
Methylene chloride (Dichloromethane)
Naphthalene
2-Nitropropane
n-Propylbenzene
Propionitrile (Ethyl cyanide)
Styrene
Tertiary amyl methyl ether
Tertiary butyl alcohol
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene; PCE)
Toluene

TABLE IX

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

Continued

1,2,4-Trichlorobenzene
1,1,1 -Trichloroethane, Methylchloroform
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene; TCE)
Trichlorofluoromethane (CFC- 11)
1,2,3-Trichloropropane
1,2,4-Trimethylbenzene
1,3,5-Trimethylbenzene
Vinyl acetate
Vinyl chloride (Chloroethene)
Xylene (total)

Semi-Volatile Organic Compounds:

USEPA Method 8270 - base, neutral, & acid extractables

Acenaphthene
Acenaphthylene
Acetophenone
2-Acetylaminofluorene (2-AAF)
Aldrin
4-Aminobiphenyl
Anthracene
Benzo[a]anthracene (Benzanthracene)
Benzo[b]fluoranthene
Benzo[k]fluoranthene
Benzo[g,h,i]perylene
Benzo[a]pyrene
Benzyl alcohol
Bis(2-ethylhexyl) phthalate
alpha-BHC
beta-BHC
delta-BHC
gamma-BHC (Lindane)
Bis(2-chloroethoxy)methane
Bis(2-chloroethyl) ether (Dichloroethyl ether)
Bis(2-chloro-1-methylethyl) ether (Bis(2-chloroisopropyl) ether; DCIP)
4-Bromophenyl phenyl ether
Butyl benzyl phthalate (Benzyl butyl phthalate)
Chlordane
p-Chloroaniline
Chlorobenzilate
p-Chloro-m-cresol (4-Chloro-3-methylphenol)
2-Chloronaphthalene
2-Chlorophenol
4-Chlorophenyl phenyl ether
Chrysene

TABLE IX

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

Continued

o-Cresol (2-methylphenol)
m-Cresol (3-methylphenol)
p-Cresol (4-methylphenol)
4,4'-DDD
4,4'-DDE
4,4'-DDT
Diallate
Dibenz[a,h]anthracene
Dibenzofuran
Di-n-butyl phthalate
3,3'-Dichlorobenzidine
2,4-Dichlorophenol
2,6-Dichlorophenol
Dieldrin
Diethyl phthalate
p-(Dimethylamino)azobenzene
7,12-Dimethylbenz[a]anthracene
3,3'-Dimethylbenzidine
2,4-Dimethylphenol (m-Xylenol)
Dimethyl phthalate
m-Dinitrobenzene
4,6-Dinitro-o-cresol (4,6-Dinitro-2-methylphenol)
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Di-n-octyl phthalate
Diphenylamine
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
Endrin aldehyde
Ethyl methanesulfonate

TABLE IX

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

Continued

Famphur
Fluoranthene
Fluorene
Heptachlor
Heptachlor epoxide
Hexachlorobenzene
Hexachlorocyclopentadiene
Hexachloropropene
Indeno(1,2,3-c,d)pyrene
Isodrin
Isophorone
Isosafrole
Kepone
Methapyrilene
Methoxychlor
3-Methylcholanthrene
Methyl methanesulfonate
2-Methylnaphthalene
1,4-Naphthoquinone
1-Naphthylamine
2-Naphthylamine
o-Nitroaniline (2-Nitroaniline)
m-Nitroaniline (3-Nitroaniline)
p-Nitroaniline (4-Nitroaniline)
Nitrobenzene
o-Nitrophenol (2-Nitrophenol)
p-Nitrophenol (4-Nitrophenol)
N-Nitrosodi-n-butylamine (Di-n-butylNitrosamine)
N-Nitrosodiethylamine (DiethylNitrosamine)
N-Nitrosodimethylamine (DimethylNitrosamine)
N-Nitrosodiphenylamine (DiphenylNitrosamine)
N-Nitrosodipropylamine (N-Nitroso-N-dipropylamine; Di-n-propylNitrosamine)
N-Nitrosomethylethylamine (MethylethylNitrosamine)
N-Nitrosopiperidine
N-Nitrosospyrrolidine
5-Nitro-o-toluidine
Pentachlorobenzene
Pentachloronitrobenzene (PCNB)
Pentachlorophenol
Phenacetin
Phenanthrene
Phenol
p-Phenylenediamine
Polychlorinated biphenyls (PCBs; Aroclors)
Pronamide
Pyrene
Safrole
1,2,4,5-Tetrachlorobenzene

TABLE IX

CONSTITUENTS OF CONCERN & APPROVED USEPA ANALYTICAL METHODS

Continued

2,3,4,6-Tetrachlorophenol
o-Toluidine
Toxaphene
2,4,5-Trichlorophenol
0,0,0-Triethyl phosphorothioate
sym-Trinitrobenzene

Chlorophenoxy Herbicides:

USEPA Method 8151A

2,4-D (2,4-Dichlorophenoxyacetic acid)
Dinoseb (DNBP; 2-sec-Butyl-4,6-dinitrophenol)
Silvex (2,4,5-Trichlorophenoxypropionic acid; 2,4,5-TP)
2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)

Organophosphorus Compounds:

USEPA Method 8141A

Atrazine
Chlorpyrifos
0,0-Diethyl 0-2-pyrazinyl phosphorothioate (Thionazin)
Diazinon
Dimethoate
Disulfoton
Ethion
Methyl parathion (Parathion methyl)
Parathion
Phorate
Simazine

TABLE X- GROUNDWATER CONCENTRATION LIMITS

<u>Constituent</u>	<u>Units</u>	<u>Concentration Limit*</u>
Specific conductance	µmhos/cm	405
pH	pH Units	6.4-7.4
Total Dissolved Solids (TDS)	mg/L	310
Chloride	mg/L	14
Sulfate	mg/L	19
Nitrate-nitrite as N	mg/L	13
Total Organic Carbon	mg/L	2.7
Carbonate Alkalinity	mg/L	MDL
Bicarbonate Alkalinity	mg/L	170
Total Alkalinity	mg/L	170
VOCs (EPA 8260B)	µg/L	MDL
SVOCs (EPA 8270C)	µg/L	MDL
Chlorophenoxy Herbicides (EPA 8151A)	µg/L	MDL
Organophosphorus Compounds (EPA 8141A)	µg/L	MDL
Aluminum, dissolved	µg/L	200
Antimony, dissolved	µg/L	MDL
Arsenic, dissolved	µg/L	6.0
Barium, dissolved	µg/L	23
Beryllium, dissolved	µg/L	MDL
Cadmium, dissolved	µg/L	NE
Chromium, dissolved	µg/L	MDL
Chromium VI+, dissolved	µg/L	MDL
Cobalt, dissolved	µg/L	30
Copper, dissolved	µg/L	MDL
Cyanide, total	µg/L	510
Iron, dissolved	µg/L	NE
Lead, dissolved	µg/L	43
Manganese, dissolved	µg/L	MDL
Mercury, dissolved	µg/L	MDL
Nickel, dissolved	µg/L	MDL
Selenium, dissolved	µg/L	MDL
Silver, dissolved	µg/L	MDL
Sulfide, dissolved	µg/L	MDL
Thallium, dissolved	µg/L	MDL
Tin, dissolved	µg/L	15
Vanadium, dissolved	µg/L	30
Zinc, dissolved		

Notes:

MDL = Laboratory Method Detection Limit

NE = Not established

* Concentration limits shall be updated as additional data is obtained. Concentration limits are not required for calcium, magnesium, potassium and sodium. They shall be evaluated each reporting period with regards to the cation/anion balance and the results shall be graphically presented using a Stiff Diagram, a Piper Diagram or a Schueller Plot.

TABLE XI- SURFACE WATER CONCENTRATION LIMITS

<u>Constituent</u>	<u>Units</u>	<u>Concentration Limit*</u>
Specific conductance	µmhos/cm	330
pH	pH Units	6.6-8.7
Total Dissolved Solids (TDS)	mg/L	250
Chloride	mg/L	12
Sulfate	mg/L	19
Nitrate-nitrite as N	mg/L	3.0
Total Organic Carbon	mg/L	13
Carbonate Alkalinity	mg/L	MDL
Bicarbonate Alkalinity	mg/L	150
Total Alkalinity	mg/L	150
VOCs (EPA 8260B)	µg/L	MDL
SVOCs (EPA 8270C)	µg/L	MDL
Chlorophenoxy Herbicides (EPA 8151A)	µg/L	MDL
Organophosphorus Compounds (EPA 8141A)	µg/L	MDL
Aluminum, dissolved	µg/L	980
Antimony, dissolved	µg/L	MDL
Arsenic, dissolved	µg/L	NE
Barium, dissolved	µg/L	30
Beryllium, dissolved	µg/L	MDL
Cadmium, dissolved	µg/L	MDL
Chromium, dissolved	µg/L	MDL
Chromium VI+, dissolved	µg/L	MDL
Cobalt, dissolved	µg/L	NE
Copper, dissolved	µg/L	MDL
Cyanide, total	µg/L	1,700
Iron, dissolved	µg/L	NE
Lead, dissolved	µg/L	110
Manganese, dissolved	µg/L	MDL
Mercury, dissolved	µg/L	MDL
Nickel, dissolved	µg/L	MDL
Selenium, dissolved	µg/L	MDL
Silver, dissolved	µg/L	MDL
Sulfide, dissolved	µg/L	MDL
Thallium, dissolved	µg/L	MDL
Tin, dissolved	µg/L	NE
Vanadium, dissolved	µg/L	NE
Zinc, dissolved	µg/L	NE

Notes:

MDL = Laboratory Method Detection Limit

NE = Not established

* Concentration limits shall be updated as additional data is obtained.

TABLE XII– UNSATURATED ZONE CONCENTRATION LIMITS
 (INCLUDES CONCENTRATION LIMITS FOR GAS-PHASE VOCs)

Constituent	Units	Concentration Limit*
Specific conductance	µmhos/cm	847
pH	pH Units	6.1-7.8
Total Dissolved Solids (TDS)	mg/L	690
Chloride	mg/L	4.7
Sulfate	mg/L	180
Nitrate-nitrite as N	mg/L	38
Total Organic Carbon	mg/L	NE
Carbonate Alkalinity	mg/L	MDL
Bicarbonate Alkalinity	mg/L	600
Total Alkalinity	mg/L	600
VOCs (EPA 8260B)	µg/L	MDL
VOCs-gas (EPA TO-14)	ug/L vapor or	MDL
SVOCs (EPA 8270C)	ppbv	MDL
Chlorophenoxy Herbicides (EPA 8151A)	µg/L	MDL
Organophosphorus Compounds (EPA 8141A)	µg/L	MDL
Aluminum, dissolved	µg/L	NE
Antimony, dissolved	µg/L	NE
Arsenic, dissolved	µg/L	NE
Barium, dissolved	µg/L	NE
Beryllium, dissolved	µg/L	NE
Cadmium, dissolved	µg/L	NE
Chromium, dissolved	µg/L	NE
Chromium VI+, dissolved	µg/L	NE
Cobalt, dissolved	µg/L	NE
Copper, dissolved	µg/L	NE
Cyanide, total	µg/L	NE
Iron, dissolved	µg/L	NE
Lead, dissolved	µg/L	NE
Manganese, dissolved	µg/L	NE
Mercury, dissolved	µg/L	NE
Nickel, dissolved	µg/L	NE
Selenium, dissolved	µg/L	NE
Silver, dissolved	µg/L	NE
Sulfide, dissolved	µg/L	NE
Thallium, dissolved	µg/L	NE
Tin, dissolved	µg/L	NE
Vanadium, dissolved	µg/L	NE
Zinc, dissolved	µg/L	NE

Notes:

MDL = Laboratory Method Detection Limit

NE = Not established

Ppbv = Parts per billion by volume

* Concentration limits shall be updated as additional data is obtained. Concentration limits are not required for calcium, magnesium, potassium and sodium. They shall be evaluated each reporting period with regards to the cation/anion balance and the results shall be graphically presented using a Stiff Diagram, a Piper Diagram or a Schueller Plot.

INFORMATION SHEET

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Background

The Norcal Waste System Ostrom Road Landfill is a Class II municipal solid waste (MSW) landfill facility located about 14 miles southeast of the City of Marysville in Yuba County. The landfill has been in operation since 1995 serving the incorporated and unincorporated areas of Butte, Colusa, Nevada, Placer, Sutter and Yuba Counties. The facility accepts nonhazardous and designated waste, including MSW to Class II waste management units at the landfill. These wastes include dewatered sewage sludge, industrial sludges, contaminated soil, dredge debris, slab/construction/demolition debris, treated wood, commercial/industrial wastes, and other non-hazardous or designated wastes.

Existing Facilities and Expansion Area

The facility is currently permitted to develop and operate two separate Class II waste disposal modules (Modules 1 and 2) with a total footprint of 221 acres. Module 1 is comprised of Cells 1 through 5 located on the eastern half of the site. Module 2 is comprised of Cells 6 through 9 located on the western half of the site. Currently only Cells 1 through 3 have been developed. These WDRs allow construction and operation of a biosolids management facility (BMF) which includes up to two Class II surface impoundments for dewatered sewage sludge storage and a Class II land treatment unit (LTU) within the permitted facility footprint.

Alternative Daily Cover

The Discharger uses various non-hazardous and designated wastes accepted at the landfill as alternative daily cover (ADC) on landfill modules, including construction and demolition (C&D) debris (which includes processed C&D fines and unders), green waste, sludge, contaminated soils, shredded tires, and plastic tarps. These WDRs include a discharge specification requiring that, for each type of waste, the Discharger must first demonstrate that it does not pose a threat to water quality and meets the requirements for use as ADC under Title 27 CCR Section 20705.

Soil Manufacturing

It is estimated that there is a minor deficit in the amount of soil needed for future module construction activities and operations and the available onsite supply from the various borrow sources. The Discharger is expected to increase the use of ADC material in order to achieve an overall soil balance at the site. The Discharger plans to make up the difference by importing soil and ADC, and from soil manufacturing operations. Soil manufacturing operations involve the mixing of borrow soil and dried sewage sludge (sludge), so as to create a soil-type product suitable for the operations layer material.

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Soil manufacturing operations will be conducted during the dry season within the LTU area. If used as ADC, the sludge will be air-dried as necessary until it meets applicable regulatory requirements and can be handled and used effectively as ADC. Once adequately air-dried, the sludge will be transported to the working face and used as ADC, or temporarily stockpiled on a lined landfill unit for future use. If used to manufacture an operations layer, the sludge will be admixed with soil at a ratio of at least 1 part soil to 4 parts dried sludge by volume (1:4).

Liner Performance Demonstration

The Discharger submitted a *Liner Performance Demonstration Report Future Class II Liner Systems, Ostrom Road Landfill* dated 1 October 2002. The proposed containment system for the floor of all future Class II landfill cells consists of the following components from top to bottom:

- Operations layer (12-inch minimum thickness);
- 8-oz. geotextile filter layer;
- LCRS gravel layer (12-inch minimum thickness);
- Primary 60-mil HDPE geomembrane;
- 2.5-foot thick CCL with a permeability of 1×10^{-7} cm/s or less;
- Leak detection geocomposite;
- Secondary 60-mil HDPE geomembrane liner; and
- Compacted subgrade comprised of soils classified as CL, CH, or SC per the Unified Soil Classification System (USCS)

The containment system for the side slope areas of all future Class II landfill cells is as follows (from top to bottom):

- Operations layer (12-inch minimum thickness);
- 8-oz geocomposite filter/geonet;
- 60-mil textured HDPE geomembrane;
- Minimum 24-inches of low permeability compacted soil liner;

The Discharger will provide comprehensive construction quality control during the liner system construction, complete an electrical leak location survey to verify the integrity of the primary liner system, and install LFG collection pipes within the LCRS to control LFG in the future, if necessary.

The liner demonstration report compared efficiencies and leakage potential of six different liner system designs. A total leakage potential of 0.8 gallons/acre/day was calculated throughout the life of the landfill (operations and 30-year post-closure period) based on a hypothetical 15-acre cell. In addition, a cost-benefit analysis was performed which showed that additional liner components would cost significantly more without significantly reducing the leakage potential. As such, the demonstration concluded that a more stringent liner system is not warranted since the proposed system will meet the performance requirements of Title 27 CCR.

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Closure

The Discharger submitted a May 2002 Joint Technical Document that included a preliminary closure and post-closure maintenance plan (PCPCMP) for the facility. Under the PCPCMP, the final cover will be constructed over the waste as part of the closure activities. The maximum height for the closed facility, including final cover, is 365 feet mean sea level (MSL), which corresponds to a height of 255 feet above grade (using a reference ground elevation of 110 ft MSL). The final cover side slopes will have a maximum slope of 3:1 (horizontal-to-vertical), with 20-foot wide benches at intervals not exceeding 50 feet vertically. The crest will have a minimum slope of five percent to ensure adequate drainage and control erosion.

The Discharger proposes an engineered alternative final cover design as follows:

For the top deck areas of the landfill consisting of (from top to bottom):

- A one-foot thick vegetative soil layer;
- A 60-mil HDPE geomembrane;
- A low-permeability geosynthetic clay layer (GCL); and
- A one-foot thick foundation layer.

The side slope design includes (from top to bottom):

- A one-foot thick vegetative soil layer;
- A geocomposite drainage layer;
- A 60-mil HDPE geomembrane; and
- A one-foot thick foundation layer.

The Discharger has previously made the demonstration that the EAD will provide equal or better performance than the prescriptive standard. The Discharger showed that the geosynthetic materials proposed can tolerate substantially higher strains up to 10 to 18 percent or greater before yielding and can tolerate strains 10 times larger than its soil components. As such, a two-foot thick foundation is not necessary for geosynthetic materials and that a one-foot thick foundation layer is adequate to provide a clean, firm surface for its installation. In addition, the Discharger provided a hydraulic equivalency evaluation for the system using HDPE that showed significantly improved infiltration performance over the prescriptive cover system. The EAD was described and approved in previous WDRs Order No. R5-2003-0118.

Groundwater Monitoring

The groundwater table underlying the site is currently encountered at elevations of 42 feet above mean sea level (MSL) under the western portion of the site, at about 60 feet MSL in the central portion of the site, and about 90 feet MSL in the eastern portion of the site. As such, the general direction of groundwater flow is from east to west. Eventually the monitoring well network will consist of 14 permanent monitoring well locations. 7 interim wells located within the footprint of the landfill will provide interim monitoring points as the landfill is developed. Additional temporary

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monitoring wells will be installed downgradient of the biosolids management facility and monitored until the facility is clean closed. The Discharger uses the tolerance interval method for the statistical evaluation of groundwater monitoring data for naturally-occurring compounds.

Evaluation Monitoring and Corrective Action

VOCs and elevated concentrations of total dissolved solids (TDS), chloride and metals have been detected in Pan Lysimeter PL-1A which is directly overlain by leachate Sump 1A on the north side of Landfill Cell 1A. In September 2000, the Discharger began implementation of an Evaluation Monitoring Program (EMP) to assess the nature and extent of the release from the sump. The results of the Discharger's January 2001 Engineering Feasibility Study (EFS) show that there is a leak between the sump and the pan lysimeter. The leak may be due in part to a defect in a retrofitted boot sleeve that envelops the Pan Lysimeter PL-1A riser access pipe and/or defect(s) in the composite liner. Pan Lysimeter PL-1A is underlain by fill and by the original 2-foot thick low-permeability clay liner.

Suction Lysimeter VZ-2 is located beneath Pan Lysimeter PL-1A. Data collected from Suction Lysimeter VZ-2 reveals a statistically significant upward trend for chloride. Chloride has been detected at a maximum concentration of 52 mg/L, which exceeds the concentration limit of 4.1 mg/l. In response, Piezometer PZ-13 was installed in June 2002 adjacent to the riser pipe for Pan Lysimeter PL-1A to monitor for potential leachate leakage from Sump 1A into the unsaturated zone and shallow ephemeral perched groundwater.

Piezometer PZ-13 has had water present for sample collection intermittently (first quarter 2004 and second quarter 2006). In the first quarter of 2004, VOCs were detected in Piezometer PZ-13 (1,1-DCA at 1.2 ug/L, MTBE at 5.2 ug/L, and six others at trace levels). In the second quarter 2006, inorganic sample results for Piezometer PZ-13 were lower than those in 2004, indicating that operation of the additional Landfill Gas (LFG) extraction wells along the northern boundary of Cell 2 has had a positive effect. Results of general parameters and lack of VOCs detected in the fourth quarter 2007 sampling of Suction Lysimeter VZ-2 indicate that water from Pan Lysimeter PL-1A has not impacted underlying water in the vicinity of this unsaturated zone monitoring point.

In the first quarter 2006, water was detected for the first time in pan lysimeter PL-1B on the south side of Landfill Cell 1B. Initial monitoring results included elevated concentrations of EC, TDS, and bicarbonate alkalinity, and VOC concentrations above the reporting limit. Based on these results, a recommendation to transfer Pan Lysimeter PL-1B to the corrective action monitoring program was made.

In 2006, the Discharger investigated the source of the liquid in Pan Lysimeter PL-1B and based on observations of the pipe boot and liner termination concluded that the pipe boot might not have been completely sealed. Additional sealing of the exposed area was completed, and a layer of bentonite was placed around the pipe boot. Concentrations of most organic constituents in Pan Lysimeter PL-1B have decreased (chloride, sulfate, and TDS) since the first quarter 2006, though bicarbonate remains elevated. The number and concentrations of VOCs detected in the fourth quarter of 2007 are lower than past quarters.

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A release of VOCs has occurred from Landfill Cell 2A. In April 2001, liquid containing VOCs at concentrations up to 20 µg/L was detected in Pan Lysimeter PL-2A which is located beneath Sump 2A on the north side of Cell 2A. In August 2001, the Discharger began implementation of an EMP to evaluate the possible sources of liquids and VOCs detected in Pan Lysimeter PL-2A. To evaluate the potential source of liquids in PL-2A, two piezometers (PZ-11 and PZ-12) were installed along the north side of Cell 2 and liquid levels in PL-2A and Sump 2A were evaluated. Both piezometers were screened in a sand and gravel layer from approximately 10 to 20 feet bgs. To evaluate the potential source of VOCs in PL-2A, two soil probes were advanced approximately 25 to 30 feet north of Cell 2 and soil gas samples were obtained from depths of approximately 10 feet bgs.

Data collected as a part of the EMP and from investigations conducted for the EFS show the presence of VOCs in soil gas in shallow soils approximately 25 to 30 feet north of landfill Cell 2. In addition, VOCs have been detected in liquids from Piezometer PZ-11. In November 2001, Regional Board Staff requested a revised EFS which incorporates the necessary gas control measures and describes the proposed installation of dedicated sump pumps with automated fluid level switches in Sumps 1A and 2A and transducers in pan lysimeters PL-1A and PL-2A. The Discharger submitted a workplan for interim LFG control measures to control the source of LFG impacting the vadose zone. An amended version to the workplan was approved on 5 June 2002. The interim measures were designed to reduce LFG pressure and gas-phase concentrations of VOCs in the leachate collection and removal layer at the bottom of the landfill cells by connecting a LFG extraction system to sump risers and cleanout pipes in Cells 1 and 2.

Interim LFG control measures commenced on 30 October 2002. Additional LFG measures were implemented in 2006 and 2007 in accordance with New Source Performance Standards (NSPS) as required by the Feather River Air Quality Management District. Operation of the LFG collection system is a required corrective action measure to reduce gas-phase concentrations of VOCs that have been detected in the unsaturated zone. LFG is extracted from the LCRS through the sump risers, the geonet drainage layer, and thirteen in-waste LFG extraction wells in Cells 1 and 2. The extracted LFG is currently flared; however, a LFG-to-energy facility is currently under construction at the facility. To evaluate the effectiveness of the gas control system, gas samples are obtained from the designated extraction and corrective action monitoring points at least quarterly and monitored for methane, carbon dioxide and oxygen. Additional gas extraction and control systems will be installed in future cells as the landfill expands as required by NSPS.

Corrective action measures for the releases from Landfill Cells 1A and 2A consist of implementation of LFG control measures described in Finding No. 42 and an automated leachate extraction system in Sumps 1A and 2A. Pressure transducers have been installed in underlying Pan Lysimeters PL-1A and PL-2A allowing for automated measurements of liquid levels above the base of the pan lysimeters. A *Corrective Action Assessment Report*, which presented an assessment of the interim corrective action measures was submitted on 24 May 2004. Improvements to the LFG control system have been made to increase the system's collection capacity. A total of thirteen in waste extraction wells (EW-1 through EW-13), two perimeter extraction wells (PEW-1 and PEW-2), and two additional LCRS risers (Sumps 1B and 2B) have been installed and tied into the LFG extraction system.

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Expansion of the gas control system will continue as the site is developed. Water monitoring results collected in 2007 indicate that operation of the existing LFG control system has reduced the overall number and concentration of VOCs detected in shallow groundwater, the unsaturated zone, and has resulted in a reduction in some of the VOCs in the leachate.

The Monitoring and Reporting Program describes the corrective action monitoring that is required to demonstrate the effectiveness of the corrective action measures per Title 27 CCR, Section 20430, as well as concurrent detection monitoring to provide the best assurance of the detection of potential subsequent releases per Title 27 CCR, Section 20385(c) and Section 20420. The Discharger must demonstrate that the facility complies with its Water Quality Protection Standard, including any applicable concentration limits greater than background, before the facility can cease corrective action monitoring and return to facility-wide detection monitoring.

Leachate and Condensate Management

As part of the amended RWD/JTD submitted on 8 August 2008, the Discharger requested to be allowed to return leachate and landfill gas condensate to the units from which they came to reduce leachate and condensate management costs. These units are Cells 1 through 9. Title 27 CCR 20340(g) requires that leachate be returned to the unit from which it came or be discharged in a manner approved by the Regional Water Board. This section also references State Water Board Resolution No. 93-62 regarding liquids restrictions in 40CFR 258.28 for MSW landfills. 40CFR 258.28 states that liquid waste may not be placed in MSW landfill units unless the waste is leachate or gas condensate derived from the landfill unit and it is designed with a composite liner and leachate collection system. Therefore, leachate and landfill gas condensate from composite lined units at the landfill may be returned to the unit from which they came. This Order includes requirements for returning leachate and landfill gas condensate back to the units such that it is not exposed to surface water runoff, will not cause instability of the landfill, and will not seep from the edges of the units.

Surface Water Drainage

Within the landfill footprint, surface water runoff is controlled by down-drains and drainage ditches flowing to the sediment basins. The sediment basins are located on the southwest side and northeast side of the landfill of the landfill respectively. Settled water is pumped (when necessary) from the basins to drainage channels that drain towards Best Slough, which borders the southern end of the landfill property. Best slough runs along the southern boundary of the site and discharges to the Feather River approximately 10 miles to the west.